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ORIGINAL

January 31, 2014

Arizona Corporation Commission
DOCKETED

JAN 31 2014

DOCKETED BY

Mr. Steve Olea
Director, Utilities Division
Arizona Corporation Commission
1200 W. Washington Street
Phoenix, AZ 85007

Re: Ten-Year Plan – Eighth Biennial Electric Transmission Assessment for 2014 through 2023; Docket No. E-00000D-13-0002

Dear Mr. Olea:

Enclosed are an original and thirteen (13) copies of The Salt River Project's 2014-2023 Ten-Year Transmission Plan filed pursuant to A.R.S. Section §40-360-02.

Please contact Mr. Steve Cobb, Director, Transmission Planning Department at (602) 236-3965 if you have any questions concerning this plan.

Sincerely,

Robert R. Taylor

RRT/jkb

Enclosures (14)

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2014

Salt River Project Ten Year Plan Transmission Projects 2014-2023

Prepared for the Arizona Corporation Commission

January 2014

Docket No. E-00000D-13-0002

Table of Contents

Introduction

This report updates and replaces the ten year transmission plan of the Salt River Project Agricultural Improvement and Power District (SRP), submitted in January 2013 pursuant to A.R.S. Section 40-360.02. The 2014-2023 Plan describes planned transmission lines of 115kV or higher that SRP may construct or participate in over the next ten years.

Regional Planning Forums

SRP continues to be involved in regional and sub-regional planning organizations. SRP's primary goal in its involvement in these various planning activities is to ensure that a reliable and economical transmission system is connected to energy sources that provide dependable power at reasonable prices to our customers. Participation in the regional and sub-regional planning organizations also allows SRP to better assess its power generation options and ensures SRP's transmission plans are coordinated with the plans of the other transmission providers.

The regional and sub-regional planning organizations operate in public forums, develop plans in a collaborative fashion, perform study work cooperatively and disseminate the study results to a broad spectrum of interested and affected parties.

SRP is active in both the Western Electric Coordinating Council (WECC) and WestConnect organizations. WECC's Planning Coordination Committee (PCC) and Transmission Expansion Planning Policy Committee (TEPPC) are important regional planning forums for the Western Interconnection. It is in these forums where SRP and all interested parties discuss and coordinate plans within the ten year planning horizon (PCC) and longer term (more than ten years) policy investigations (TEPPC).

SRP participates in the regional transmission planning activities of WestConnect. WestConnect is comprised of 17 utility companies with transmission assets in the western United States. Its members collaboratively assess stakeholder needs and develop cost-effective transmission and wholesale market enhancements. WestConnect is committed to coordinating its work with other regional industry efforts to achieve as much consistency as possible in the Western Interconnection. Since 2008 the WestConnect Planning Management Committee has completed

and approved annual Ten Year Transmission Plans in which SRP participates. The next WestConnect Ten Year Transmission Plan will be completed in February 2014.

SRP has also been an active participant in the WestConnect regional transmission planning and cost allocation processes recently required by Federal Energy Regulatory Commission (FERC) Order No. 1000. While SRP is not required to participate in the Order No. 1000 process, SRP recognizes the importance of maintaining a collaborative and cooperative transmission planning process in the West.

The Southwest Area Transmission Planning Group (SWAT), with its technical study subcommittees, work groups, and study groups, addresses future transmission needs on a sub-regional (desert southwest) basis. SRP is engaged in various SWAT activities and relies on the following SWAT entities to meet obligations for the Arizona Corporation Commission (ACC) and the Ten Year Plan filing: Arizona Transmission System (ATS)[1], Short Circuit Work Group, Eldorado Valley Study Group, and the Transmission Corridor Work Group. SWAT disseminates its work publically and coordinates its studies and data with other sub-regional planning groups and WestConnect.

Biennial Transmission Assessment (BTA) Order Requirements

7th BTA Order Requirements

The ACC has required jurisdictional entities to notify parties requesting generation or transmission interconnections to the Bulk Electric System of the appropriate ACC filing requirements. While not subject to the ACC's jurisdiction for purposes of the BTA, SRP nevertheless placed an advisory notice on SRP's OASIS page on March 19, 2013 to satisfy this requirement: http://www.oatioasis.com/SRP/SRPdocs/Potential_Additional_State_Requirements.pdf.

SRP bears no responsibility for the compliance with ACC requirements by any party seeking interconnection.

[1] The former Central Arizona Transmission System (CATS), Colorado River Transmission (CRT) and Southern Arizona Transmission System (SATS) subcommittees were merged to form the ATS subcommittee in February 2013.

Prior BTA Order Requirements

The following sections highlight SRP's responses to ongoing activities related to prior BTA orders. The ACC's 6th BTA order adopted several requirements that apply to jurisdictional utilities; however, SRP has agreed to voluntarily comply with the following requirements. The ongoing requirements include:

a) reporting relevant findings in future BTAs regarding compliance with transmission planning standards (e.g. TPL-001 through TPL-004) from NERC/WECC reliability audits that have been finalized and filed with FERC.

b) identifying planned transmission reconductor projects, transformer capacity upgrade projects and reactive power compensation facility additions at 115 kV and above in future BTA ten year plan filings.

c) discussing the effects of distributed renewable generation and energy efficiency programs on future transmission needs in future ten year plan filings.

SRP's voluntary compliance with these requirements is as follows:

Requirement a)

SRP was last audited on its compliance with NERC Standards TPL-001-0, TPL-002-0, and TPL-003-0 in August 2013. The WECC Audit team determined there were no findings on these three Standards. SRP will report relevant NERC audit findings in future BTAs once the findings are finalized and filed with the Federal Energy Regulatory Commission (FERC).

Requirement b)

SRP's planned transmission reconductor, transformer capacity upgrades, and reactive power compensation additions in this ten year period are shown below and are being provided for informational purposes only.

Reactive Devices

A 500kV shunt reactor will be installed as part of the Southeast Valley Project[2]. This reactor will be located at the Pinal Central Substation, and the reactor size is 170 MVAR (base is 525kV). The timing of installation of the device is proposed to occur in 2014.

[2] The Pinal West – Pinal Central – Abel – Browning project is commonly referred to as the Southeast Valley Project.

A second 100 MVAR line reactor is also planned for installation in 2017 on the Silver King-Coronado 500kV transmission line. The second reactor would be used as a back-up to the first, and would increase reliability and operational flexibility of the system.

Transformers

The following are the currently planned transformer additions to existing stations to accommodate load growth, including the anticipated installation schedule, during this ten year planning horizon:

- Browning 230/69kV (2014)
- Rudd 230/69kV (2019)

Requirement c)

SRP includes the effects of energy efficiency programs and distributed generation (traditional and renewable) in its resource planning and transmission system models. Thus, each of the transmission projects identified in this ten year transmission plan includes the effects of energy efficiency and distributed generation.

SRP Ten Year Plan Study Work

Attachment 1 included with this filing is a study that analyzed the impact on system reliability of the projects identified in the Ten Year Plan. Study work for joint projects relies on sub-regional and previously submitted studies.

Changes from Previous Plan

The following changes are noted between the Ten Year Plan submitted in January 2013 and this submittal. The changes include project or substation names, in-service dates, projects now in service, and newly identified projects.

Projects Placed in Service in 2013

- 3rd Schrader 230/69kV Transformer
- Rogers – Thunderstone 230kV Reconductor

Revised Project and Substation Names

- No changes

Revised In-Service Dates

- Superior – Silver King 115kV re-route was 2014, now 2015
- Eastern Mining Expansion was 2016, now 2018
- SunZia was 2016, now 2017
- Price Road Corridor was 2016, now 2015-TBD
- Abel – Pfister – Ball 230kV was 2020-2021, now 2021
- New Superior – New Oak Flat 230kV was 2019, now 2021
- New Oak Flat – Silver King 230kV was 2019, now 2021

New Projects

- Ellsworth Technology Corridor (2019)

Removed Projects

The Silver King – New Pinto Valley 230kV (2021) project was removed from this ten year plan because the customer is no longer pursuing this option for expansion.

Potential Projects

The following projects were included in previous plans with TBD in-service dates and have not advanced in SRP's planning process. These projects were removed from the ten year plan with the January 2013 submittal. In order to provide further transparency, SRP will continue to reflect these and other projects under consideration that fall outside of our ten year planning window as "Potential Projects" in future filings.

- **Superior 230kV loop-in** – to provide adequate transmission capacity in the event of future load growth in SRP's eastern service territory
- **Thunderstone – Browning 230kV** – to provide additional transfer capability from the south and east to the north and central areas of SRP's service territory
- **Silver King – Knoll – New Hayden 230kV** – to increase the transmission capacity to serve new customer load in SRP's eastern service territory
- **New Hayden 115kV loop-in** – to increase the transmission capacity to serve new customer load in SRP's eastern service territory
- **RS25 Project** – to serve growing Salt River Project – Maricopa Indian Community load
- **RS26 Project** – to serve load growth in the Fountain Hills area and to relieve stress on the lower voltage system that serves the Fountain Hills/Rio Verde area
- **Hassayampa – Pinal West 500kV #2** – to accommodate load growth and access energy sources in the central Arizona region

- **Pinal Central – Abel – RS20 500kV** – for delivery of remote resources into the southeast portion of SRP's service territory
- **Northeast Arizona to Phoenix 500kV** – to facilitate the delivery of resources from Northeast Arizona into eastern metropolitan Phoenix
- **Palo Verde – Saguaro 500kV** – to increase the adequacy of the existing EHV transmission system and permit increased power delivery throughout the state
- **Ball (RS17) 230kV Loop-in** – to serve customer load in the Gilbert/Queen Creek area
- **Silver King – Browning 230kV** – to deliver Coronado or other power in eastern Arizona into SRP's service territory
- **Pinnacle Peak – Brandow 230kV** – to provide adequate transmission capacity to accommodate SRP customer load
- **Browning – Corbell 230kV** – to provide adequate transmission capacity to accommodate future load growth

Project Maps

The following pages are maps showing the general location of existing and future transmission projects. Substation locations and line routings depict an electrical connection only and do not reflect any assumed physical locations or routing. Separate maps are provided for the 500kV system, an overview of the 230kV system and then a larger view of the 230kV system broken down into west and east views. The 115kV map primarily covers the 115kV Eastern Mining Area of SRP's service territory; however, some 230kV projects are also included.

The maps included in this report are:

Figure 1 - SRP 500kV system

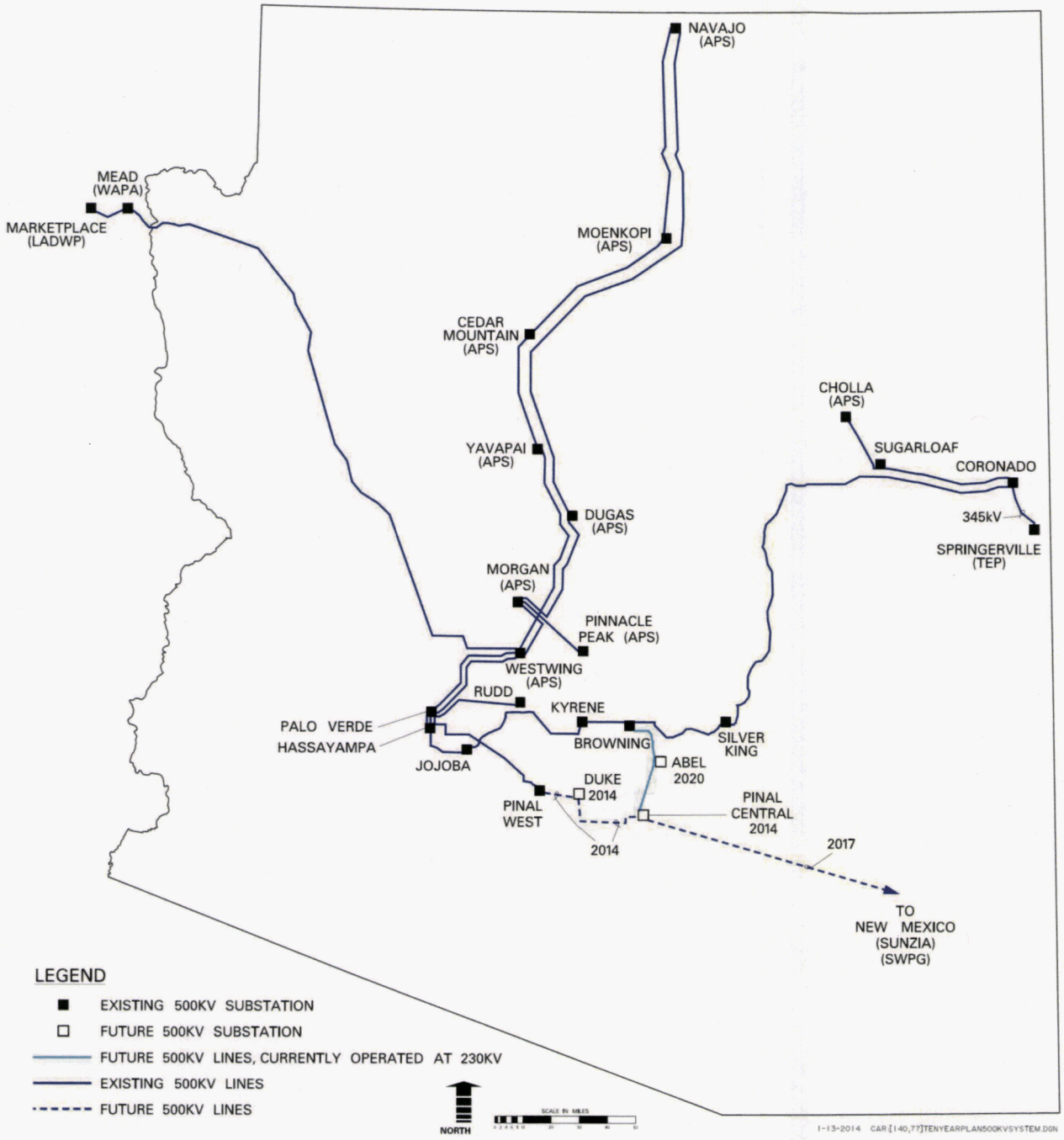
Figure 2 - SRP 230kV system overview

Figure 3 - Detail of SRP's 230kV west system

Figure 4 - Detail of SRP's 230kV east system

Figure 5 - SRP's 115kV Eastern Mining Area

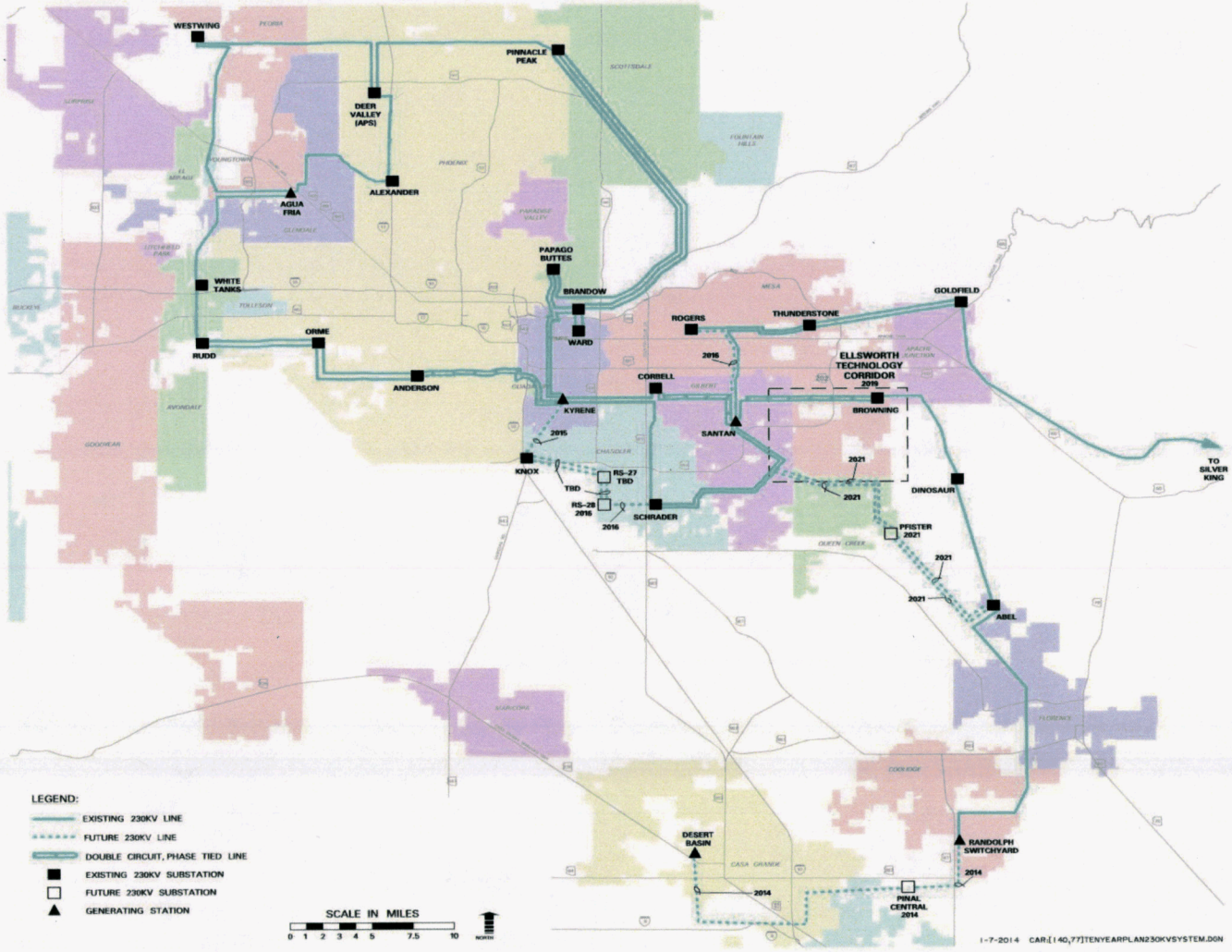
SRP's 500kV System



Substation locations and line routings depict an electrical connection only and do not reflect any assumed physical locations or routing.

Figure 1 - SRP 500kV System

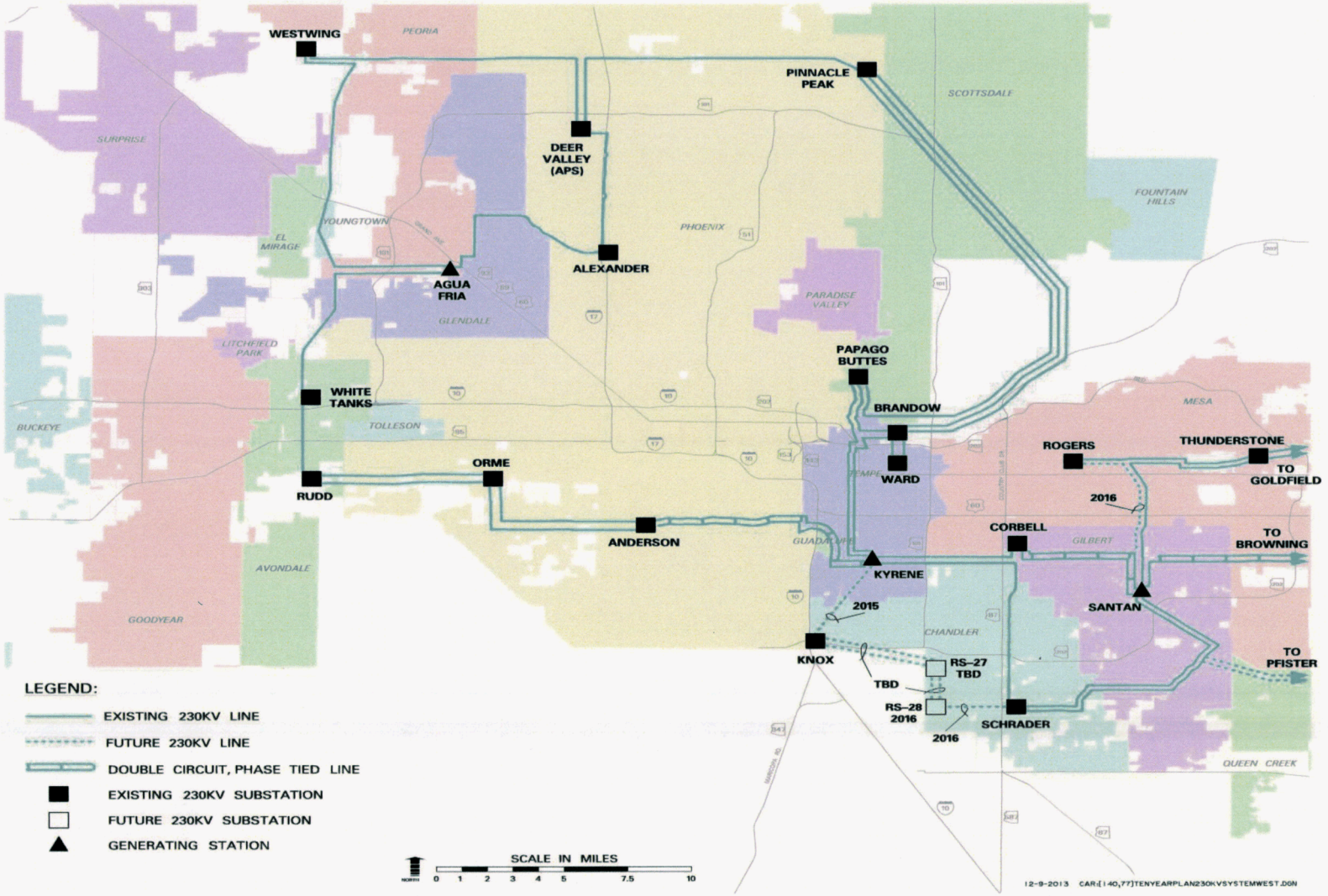
SRP's 230kV System Overview



Substation locations and line routings depict an electrical connection only and do not reflect any assumed physical locations or routing.

Figure 2 - SRP 230kV System Overview

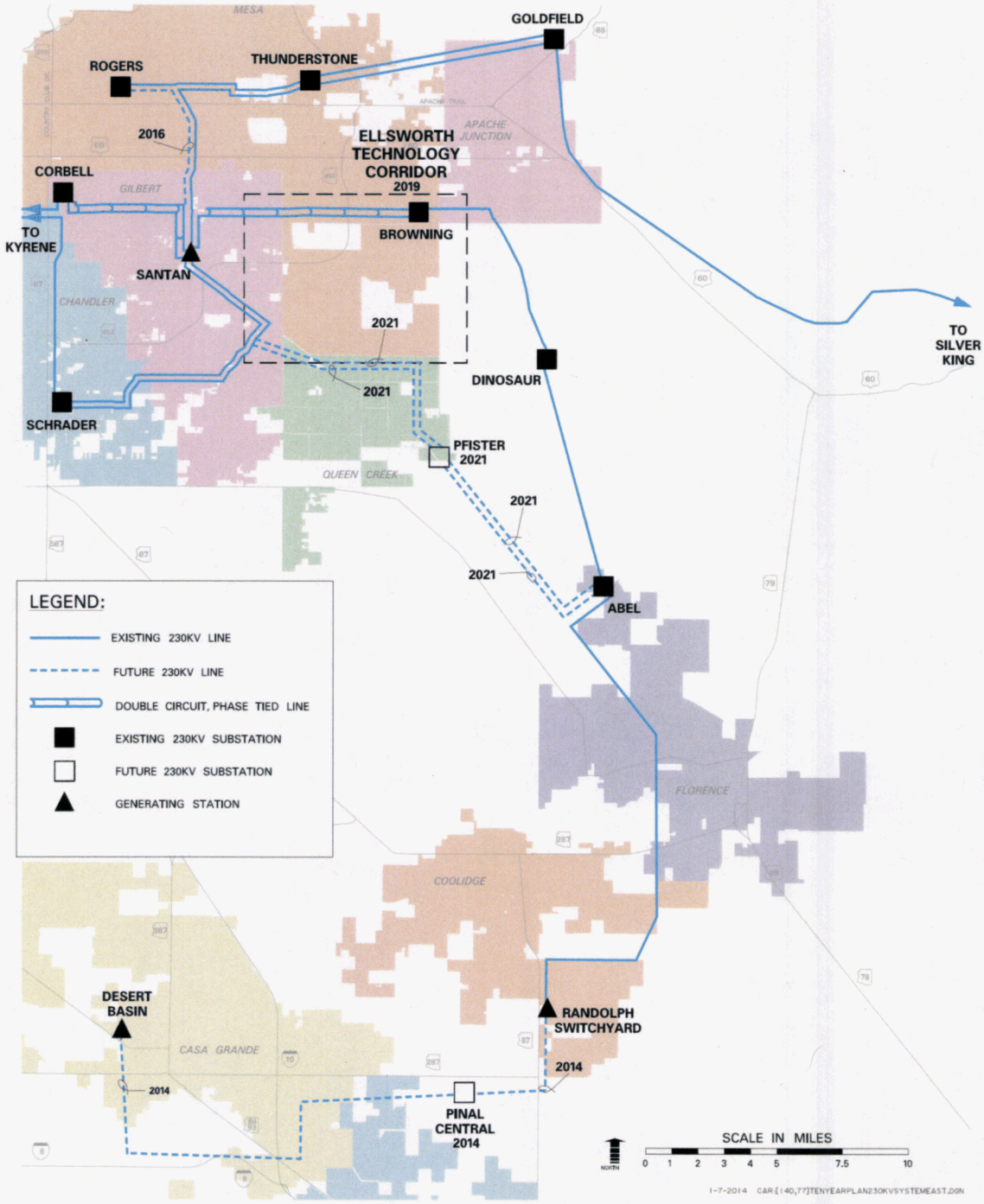
SRP's 230kV West System



Substation locations and line routings depict an electrical connection only and do not reflect any assumed physical locations or routing.

Figure 3 - Detail of SRP's 230kV West System

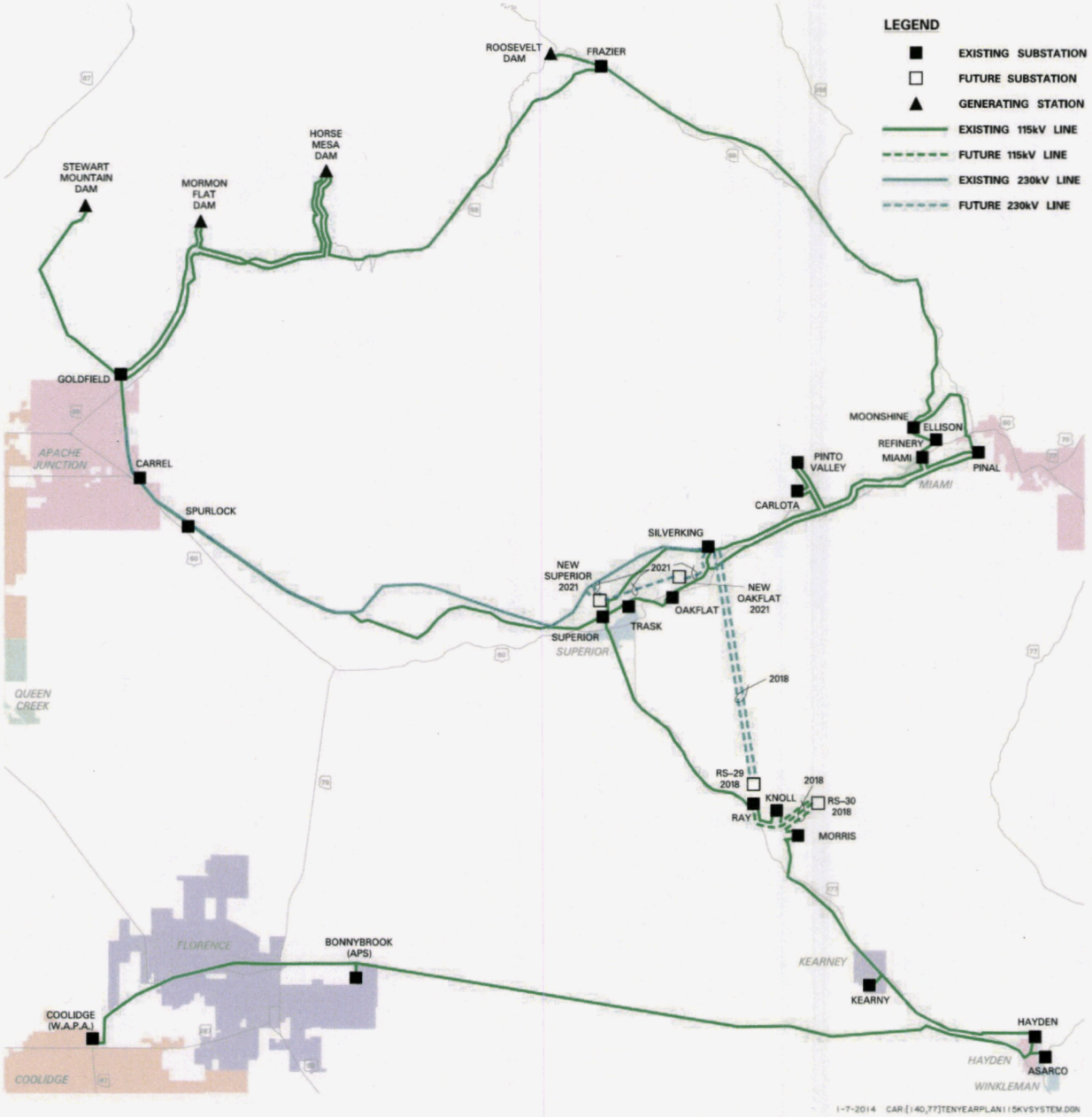
SRP's 230kV East System



Substation locations and line routings depict an electrical connection only and do not reflect any assumed physical locations or routing.

Figure 4 - Detail of SRP's 230kV East System

SRP's 115kV System (Eastern Mining Area)



Substation locations and line routings depict an electrical connection only and do not reflect any assumed physical locations or routing.

Figure 5 - SRP's 115kV Eastern Mining Area (Note: Superior – Silver King 115kV re-route not shown due to scale of map)

Project Descriptions

The following pages provide project detail, meeting the requirements of A.R.S. Section 40-360.02. Each project is identified by name, estimated in-service date, sizing details, routing, purpose, and major milestone dates.

Pinal West – Pinal Central – Abel – Browning 500 & 230kV line (2014-2020)

Size

Voltage	500 & 230kV
Capacity	Approximately 1500MVA
Point of Origin	Pinal West 500kV Substation SEC 18, T5S, R2E
Intermediate Point	Duke 500kV Substation SEC 30, T5S, R4E
Intermediate Point	Pinal Central 500kV Substation SEC 30, T6S, R8E
Intermediate Point	Randolph 230kV Switchyard SEC 10, T6S, R8E
Intermediate Point	Abel 500kV Substation SEC 19, T3S, R9E
Intermediate Point	Dinosaur 230kV Substation SEC 10, T2S, R8E
Point of Termination	Browning 500kV Substation SEC 12, T1S, R7E
Length	Approximately 100 Miles

Routing

South and east from the Pinal West Substation to approximately Teel Road, then east to the vicinity of the Duke (formerly Santa Rosa) Substation. From Duke easterly to approximately the Santa Rosa Wash, then generally south to approximately a half mile north of I-8 where it turns east again. Then it runs easterly to about the location of the Pinal Central Substation (near the ED2 Substation). From that point the line continues east to the Union Pacific Railroad, where it turns north. It generally runs north from this point to the Abel Substation in the vicinity of the Magma Railroad and the CAP, then north along the CAP to the existing 500kV corridor between Elliot and Guadalupe Roads. At that point it turns west into the Browning Substation.

Pinal West – Pinal Central – Abel – Browning 500 & 230kV line (2014-2020) continued

Purpose

The Central Arizona Transmission System Study identified a number of system additions necessary to accommodate load growth and access to energy sources in the central Arizona area. This transmission line is the second segment of a series of transmission lines to serve the central Arizona region. This segment will initially provide an interconnection with the Palo Verde market area to market power to the Phoenix and central Arizona areas, and to accommodate the growth in development and population in Pinal County.

Schedule

Right of Way/ Property Acquisition	2005
Construction Start	2006
Estimated In-Service	2014 – Pinal Central – Randolph 230kV
	2014 – Pinal Central – Browning 500kV (The remaining portion of the 500kV line from Randolph to Pinal Central will be constructed and the line will be placed in service at 500kV. The line from Randolph-Browning was placed in service at 230kV in 2010.)
	2014 – Pinal West – Pinal Central 500kV and 230kV
	2014 – Pinal Central 500kV and 230kV Substation
	2014 – Duke 500kV Substation
	2020 – Abel 500kV Substation
Actual In-Service	2007 – Dinosaur 230kV Substation
	2007 – Dinosaur – Browning 230kV
	2010 – Randolph – Browning 500kV energized at 230kV (The remaining portion of the 500kV line from Randolph to Pinal Central will be constructed and the line will be placed in service at 500kV in 2014.)
	2010 – Randolph – Abel – Dinosaur 230kV
	2011 – Abel 230kV Substation

Notes

The authorization for this project is provided for in the CEC for Case No. 126 (Pinal West to Browning), which was awarded in 2005 (ACC Decision # 68093 and # 68291). SRP was awarded ACC Decisions # 69183 and 70610 that allow for the attachment of the 230kV line to the previously approved 500kV structures. The CEC for the project expires August 25, 2025.

SRP is the project manager for the development of this participant project.

Desert Basin – Pinal Central 230kV (2014)

Size

Voltage	230kV
Capacity	Approximately 630MVA
Point of Origin	Desert Basin Power Plant 230kV Switchyard SEC 13, T6S, R5E
Intermediate Point	None
Point of Termination	Pinal Central 230kV Substation SEC 30, T6S, R8E
Length	Approximately 21 miles

Routing

For approximately 6 miles from the Desert Basin Generating Station in Casa Grande near Burris and Kortsen Roads generally south and east to a point on the certificated Pinal West – Pinal Central – Abel – Browning 500kV line near Cornman and Thornton Roads. At that point the 230kV line will be attached to the 500kV structures for approximately 15 miles to the proposed Pinal Central Substation south of Coolidge, AZ.

Purpose

Remove the Remedial Action Scheme installed at Desert Basin Power Plant Switchyard; improve reliability of the 230kV system in the region by reducing the loading on existing lines in the area; increase local area system capacity; reduce reliance on second party transmission system; and establish the Pinal Central Substation, identified as one of the future injection points of power and energy into the central Pinal County load area.

Schedule

Right of Way/ Property Acquisition	2010-2013
Construction Start	2013
Estimated In-Service	2014

Notes

SRP was granted a CEC for Case No. 132 in June 2007 (ACC Decision # 69647, CEC expires June 6, 2025) for the approximately six mile portion of the project from Desert Basin Generating Station to the vicinity of Cornman and Thornton Roads south of Casa Grande. Authority for the portion of the 230kV line to be attached to the 500kV structures is addressed in Decision # 69183, which approved SRP's compliance filing for Condition 23 of the CEC in Case No. 126.

Pinal Central 500kV and 230kV Substation will be placed in service in 2014 as part of the Pinal West – Pinal Central – Abel – Browning 500 & 230kV line Project.

Price Road Corridor (2015-TBD)

Size

Voltage	230kV
Capacity	To be determined
Point of Origin	Kyrene 230kV Substation SEC 10, T1S, R4E
Intermediate Points	Knox 230kV Substation SEC 32, T1S, R4E
Intermediate Points	New RS28 230kV Substation Exact location not determined
Intermediate Points	New RS27 230kV Substation Exact location not determined
Point of Termination	Schrader 230kV Substation SEC 22,T2S, R5E
Length	Approximately 12-23 miles

Routing

Line routes will be determined through the CEC process. The project will consist of two new 230kV substations located within the Price Road Corridor (a five-square-mile area bounded by Chandler Boulevard, Chandler Heights Road, Dobson Road, Price Road and the Gila River Indian Community). The new RS28 230kV Substation will be located in the southern portion of the Price Road Corridor, and the new RS27 230kV Substation will be located in the northern portion. The project will consist of a new single circuit Schrader – RS28 230kV line; a new double circuit Knox – RS27 230kV line; a new double circuit RS27 – RS28 230kV line; and a single circuit Kyrene – Knox 230kV line.

Purpose

To serve growing industrial and commercial customer loads along the Price Road Corridor, adjacent to Price Road in south Tempe and Chandler.

Schedule

Right of Way/ Property Acquisition	2014-2015
Construction Start	2015
Estimated In-Service	2015 – Kyrene – Knox
	2016 – Schrader – RS28
	2016 – RS28 Substation
	TBD – Knox – RS27 – RS28
	TBD – RS27 Substation

Notes

SRP does not yet hold a CEC for this project, but will be seeking a Certificate. SRP has initiated an environmental and public process to site all phases of the proposed project.

Superior – Silver King 115kV re-route (2015)

Size

Voltage	115kV
Capacity	Approximately 165MVA
Point of Origin	Point on existing Superior - Silver King 115kV Line SEC 34, T1S, R12E
Intermediate Point	None
Point of Termination	Point on existing Superior - Silver King 115kV Line SEC 26, T1S, R12E
Length	Approximately 1 mile

Routing

The new alignment will traverse to the north and west of the historical line and adjacent to the existing Goldfield – Silver King 230kV circuit.

Purpose

To move an existing 115kV line on Customer's private property to accommodate Customer's land use needs.

Schedule

Right of Way/ Property Acquisition	N/A
Construction Start	2014
Estimated In-Service	2015

Notes

SRP was granted a CEC for Case No. 166 on October 4, 2012 (Decision # 73551) which expires in 5 years (October 16, 2017).

The timing of the 115kV line relocation is dependent upon the Customer's land use needs.

Rogers – Santan 230kV line (2016)

Size

Voltage	230kV
Capacity	Approximately 875MVA
Point of Origin	Rogers 230kV Substation SEC 13, T1N, R5E
Intermediate Point	None
Point of Termination	Santan 230kV Substation SEC 21, T1S, R6E
Length	Approximately 9 miles

Routing

Generally east and south from Rogers 230kV Substation to the Santan 230kV Substation, using existing circuit positions on existing structures, where possible.

Purpose

Provide adequate transmission facilities to deliver reliable power and energy to SRP's customers in the eastern valley area by upgrading existing conductors and circuits.

Schedule

Right of Way/ Property Acquisition	Not Applicable
Construction Start	2015
Estimated In-Service	2016

Notes

SRP does not anticipate needing a CEC for this project as it currently entails only reconductoring and splitting parallel lines.

SunZia Southwest Transmission 500kV Project (2017)

Size

Voltage	500kV
Capacity	Approximately 3000MVA
Point of Origin	Central New Mexico
Intermediate Point	To be determined
Point of Termination	Pinal Central 500kV Substation SEC 30, T6S, R8E
Length	460+ miles

Routing

From Lincoln County area in central New Mexico to Pinal Central 500kV Substation in Coolidge, Arizona.

Purpose

Provide access to anticipated renewable generation resources in southeastern Arizona and New Mexico.

Schedule

Right of Way/ Property Acquisition	To be determined
Construction Start	To be determined
Estimated In-Service	2017

Notes

Southwestern Power Group is the project manager on the development of this project. SRP is a participant.

Eastern Mining Expansion (2018)

Size

Voltage	230kV and 115kV
Capacity	To be determined
Point of Origin	Silver King 230kV Substation SEC 16, T1S, R13E
Intermediate Point	New RS29 230kV Substation Near SEC15, T3S, R13E (Exact location not determined)
Point of Termination	New RS30 115kV Substation Near SEC24, T3S, R13E (Exact location not determined)
Length	Approximately 12-14 miles

Routing

Several options are under consideration; however, the likely routing for the new transmission would be to follow the APS Cholla - Saguaro 500kV line until it crosses SRP's 115kV line. In that vicinity and adjacent to Ray 115kV Substation, a new 230kV substation would be constructed, tentatively called RS29. From there, the existing single circuit Ray – Knoll – Morris 115kV line would be rebuilt as a double circuit 115kV line with upgraded conductor to a new 115kV substation near Knoll and Morris 115kV substations. This substation would accommodate the new load and is tentatively called RS30.

Purpose

Additional lines needed to increase capacity to accommodate growing mining customer load.

Schedule

Right of Way/ Property Acquisition	2015/2016
Construction Start	2017
Estimated In-Service	2018

Notes

SRP does not yet hold a CEC for this project. The timing of pursuing a Certificate will be dependent upon the load growth in this area.

Ellsworth Technology Corridor (2019)

Size

Voltage	230kV
Capacity	To be determined
Point of Origin	To be determined
Intermediate Point	To be determined
Point of Termination	To be determined
Length	To be determined

Routing

Several options are under consideration to accommodate additional potential load in the Phoenix-Mesa Gateway Airport and Ellsworth Technology Corridor area located in southeast Mesa. Options under evaluation include adding new 230kV substations and lines in this area. The location of the 230kV substations and the length of any new lines will be driven by the location and type of load growth in the area.

Purpose

To meet potential growing industrial customer loads in the Ellsworth Technology Corridor and Phoenix-Mesa Gateway Airport areas.

Schedule

Right of Way/ Property Acquisition	2017
Construction Start	2018
Estimated In-Service	2019

Notes

SRP does not yet hold a CEC for this project but will pursue a Certificate if needed. The timing of pursuing a Certificate will be dependent upon the load growth in this area.

Abel – Pfister – Ball 230kV (2021)

Size

Voltage	230kV
Capacity	To be determined
Point of Origin	Santan - Schrader 230kV line (near existing Moody 69kV Substation and future Ball (RS17) 230kV Substation) SEC 1, T2S, R6E
Intermediate Point	New Pfister (RS24) 230kV Substation SEC 25, T2S, R7E
Point of Termination	Abel 230kV Substation SEC 19, T3S, R9E
Length	Approximately 20 miles

Routing

This project is a double circuit 230kV line and a new 230kV substation that connects to the existing Santan - Schrader 230kV line. The new double circuit 230kV line will be routed generally south and east from a point on the Santan - Schrader 230kV line near the existing Moody 69kV Substation and future Ball (RS17) 230kV Substation to the new Pfister (RS24) 230kV Substation in the southeastern portion of the town of Queen Creek. From Pfister 230kV Substation, the 230kV line will continue south and east to the future Abel 230kV Substation.

Purpose

To meet expected load growth in the eastern service territory.

Schedule

Right of Way/ Property Acquisition	2013-2020
Construction Start	2019-2020
Estimated In-Service	2021

Notes

This project was formerly known as Abel - Moody. SRP received a CEC for this project on December 23, 2009, Case No. 148, Decision # 71441. The CEC expires December 23, 2021.

New Superior – New Oak Flat 230kV (2021)

Size

Voltage	230kV
Capacity	To be determined
Point of Origin	New 230kV Substation near the existing Goldfield – Silver King 230kV line, tentatively named "New Superior" Near SEC34, T1S, R12E (Exact location not determined)
Intermediate Point	None
Point of Termination	New 230kV Substation near the existing Oak Flat 115kV Substation, tentatively named "New Oak Flat" Near SEC32, T1S, R13E (Exact location not determined)
Length	Approximately 3.5 miles

Routing

The alignment will traverse through the customer's property near the northern property boundary. The alignment is predominantly east to west. The location of the New Superior and the New Oak Flat sites are still being determined. The preliminary 230kV alignment will be identified after these details are received.

Purpose

To serve growing customer loads at Oak Flat.

Schedule

Right of Way/ Property Acquisition	N/A
Construction Start	2019
Estimated In-Service	2021

Notes

SRP does not yet hold a CEC for this project. The timing of pursuing a Certificate will be dependent upon the load growth in this area.

New Oak Flat – Silver King 230kV (2021)

Size

Voltage	230kV
Capacity	To be determined
Point of Origin	New 230kV Substation near the existing Oak Flat 115kV Substation, tentatively named "New Oak Flat" Near SEC32, T1S, R13E (Exact location not determined)
Intermediate Point	None
Point of Termination	Silver King 230kV Substation SEC 16, T1S, R13E
Length	Approximately 3 miles

Routing

The alignment will closely follow the existing 115kV circuit connecting Silver King to Oak Flat. The line starts at the New Oak Flat 230kV Substation, heading northwest and then turning north into the Silver King Receiving Station.

Purpose

To serve growing customer loads at Oak Flat.

Schedule

Right of Way/ Property Acquisition	N/A
Construction Start	2019
Estimated In-Service	2021

Notes

SRP does not yet hold a CEC for this project. The timing of pursuing a Certificate will be dependent upon the load growth in this area.

Attachment

Attachment 1 – Ten Year Plan Technical Analysis

2014 TEN YEAR PLAN TECHNICAL STUDY

by

SALT RIVER PROJECT

TRANSMISSION PLANNING

January 13, 2014

Table of Contents

1.0 Executive Summary

The purpose of the Ten Year Plan Technical Study is to provide supporting documentation to accompany the Ten Year Plan. Salt River Project (SRP) submits an updated ten year plan annually to the Arizona Corporation Commission. The 2014-2023 Plan describes planned transmission lines that SRP may construct or participate in over the next ten years.

The technical study assesses the performance of transmission facilities of 100kV or higher voltage by using power flow and stability analyses. The power flow study is performed for each of the ten years, beginning with 2014. System improvements and upgrades proposed within the ten year plan are included in each case. SRP facilities are studied to meet SRP internal criteria and industry standards.

The power flow analysis showed no overloads on SRP's system for N-1 outages of transmission lines and transformers of 115kV and above.

The stability study analyzes the transmission system for its ultimate ten year build-out in 2023 to ensure that the planned configuration will return to a stable state following a simulated outage. System improvements and upgrades proposed within the ten year plan are included in the case. The study results showed that the transmission system remains stable following an outage.

This report documents the study work performed and reports that SRP's transmission system plan for the coming ten years meets all of SRP's internal criteria, and satisfies applicable WECC and NERC criteria.

2.0 Study Details

Power flow and transient stability studies were completed using General Electric's (GE's) Positive Sequence Load Flow (PSLF) software. The power flow studies monitor SRP facilities for thermal and voltage responses to transmission system disturbances. Following a contingency, SRP facilities greater than 100kV were monitored. The power flow study evaluates the thermal and voltage response, and the transient stability analysis ensures that the system returns to a steady state following a contingency. The following sections highlight the details of the analysis.

2.1 Case Information

The cases used to study each of the years are based on Western Electricity Coordinating Council (WECC) cases. These cases represent the latest transmission, sub-transmission, load forecast, and resource plans. The cases are updated by SRP and APS to represent a more detailed Arizona system. The 2013 WECC HS2A approved case was used as the seed case for the study years 2014 – 2017. The cases for years 2018 – 2022 were developed from the 2018 WECC HS2A approved case. The 2023 year case used the 2023 WECC HS1A case. The system ratings for SRP's facilities used in this study were taken from the 2023 base case which can be found in Appendix A.

Each year's case is developed with the corresponding Ten Year Plan proposed projects included, to ensure that the proposed system changes will result in a stable and compliant transmission system. These projects include:

- Pinal West – Pinal Central – Abel – Browning 500 and 230kV line
- Desert Basin – Pinal Central 230kV line
- Rogers – Santan 230kV line
- Price Road Corridor
- SunZia Southwest Transmission 500kV Project
- Eastern Mining Expansion
- Abel – Pfister – Ball 230kV

Certain projects included in the Ten Year Plan have been excluded from the technical study due to the uncertainty of timing and scope as they are solely dependent on load growth developing in the areas. These projects include:

- Ellsworth Technology Corridor
- New Superior – New Oak Flat 230kV
- New Oak Flat – Silver King 230kV

2.2 Internal Planning Criteria

SRP uses the following criteria for planning its system. Any situation in which the criteria is not met, the anomaly will be noted in the results.

2.2.1 All Lines in Service

All Lines in Service (ALIS) conditions will not result in overloaded electric facilities or voltage deviations as described below:

- 500/230kV, 230/115kV, and 230/69kV transformers will not be loaded more than 100% of the transformer nominal rating.
- 500kV, 230kV, and 115kV lines and substation conductors will not be loaded in excess of 100% of their summer normal limit.
- Equipment high voltage limits will not be exceeded.
- Customer service entrance voltage limits (high or low) will not be violated. These limits are described below:
  - 230kV and above: the voltage shall not be below 1.0 per unit.
  - 115kV: the voltage magnitude will not drop below the minimum established by ANSI (standard #C84.1-1989 or most current edition, Ref 42) for service entrance voltages as reflected on the high side of the transformer.

2.2.2 Single Contingency (N-1)

Single contingency outage conditions will not result in overloaded electric facilities or voltage deviations as described below:

- 500/230kV, 230/115kV, and 230/69kV transformers will not be loaded to more than 100% of the emergency limit.
- 500kV, 230kV, and 115kV lines and substation conductors will not be loaded in excess of 100% of their emergency limit.
- Equipment voltage limits (high or low) will not be exceeded.
- Outages at 100kV or higher system voltages (including 230/69kV transformers) will not result in loss of load.
- Customer service entrance voltage limits (high or low) will not be violated. These limits are described below:
  - 230kV & above: the voltage deviation at any bus shall not exceed 5% of the pre-outage voltage.
  - 115kV: the voltage magnitude will not drop below the minimum established by ANSI (standard #C84.1-1989 or most current edition) for service entrance voltages as reflected on the high side of the transformer.
- System Stability: All machines in the system are to remain synchronous with the system as demonstrated by their relative rotor angles.
- System Damping: System damping will exist as demonstrated by the damping of relative rotor angle swings and the damping of voltage magnitude swings.
- Transient Voltage Dip: Voltage swings initiated by a simulated system disturbance shall not cause the voltage at system busses to exceed the limits specified in WECC table W-1 (Appendix B).
- Post Transient Voltage: After fault clearing, steady state system voltages shall remain within the limits specified in WECC table W-1 (Appendix B).

- Transient Frequency Dip: Frequency swings initiated by a simulated system disturbance shall not cause the frequency at system busses to exceed those limits specified in WECC table W-1 (Appendix B).

2.3 Contingencies

2.3.1 Power Flow

SRP developed the single contingency list that simulated outages of all the transmission lines and transformers in Arizona in accordance with TPL-002 (Appendix C). The transmission line outages include 500kV, 230kV, and 115kV lines, and the transformer outages include 500/230kV, 230/115kV, and 230/69kV transformers. The list of power flow contingencies used in the 2023 case can be found in the Appendix D.

2.3.2 Stability

SRP developed a contingency list in accordance with TPL-002 that simulated the three-phase fault of all the SRP transmission facilities for the following voltages: 500kV, 230kV and 115kV. The subsequent element at the faulted bus was taken out of service after the fault. The transient stability contingencies are found in Appendix F.

3.0 Results

3.1 Power Flow

The power flow analysis this year found no overloads on SRP's facilities for the N-1 outages studied. There were no voltage violations observed in the analysis. Appendix E shows results for SRP equipment loaded above 80%.

3.2 Stability

The transient stability analysis revealed that the base case was stable. For simulation of faults on SRP facilities, the system was stable and damped. The voltage and frequency at valley buses were within acceptable limits. Due to the volume of plots, the graphs for the transient stability will be made available upon request, as noted in Appendix G.

4.0 Conclusion

The power flow analysis was performed on each of the ten years, beginning in 2014. The transient stability analysis was performed in the last year, 2023, to evaluate the ultimate configuration of the transmission system. The single contingencies simulated in the Power Flow and Transient Stability analysis were simulated on SRP's system according to the NERC TPL-002 standard. SRP's system performed within the thermal, voltage, and transient stability boundaries for the studied outages with the projects proposed in the Ten Year Plan, satisfying SRP's internal planning criteria, including applicable WECC and NERC criteria.

5.0 Appendix

Appendix A – System Ratings in 2023

Voltage (kV)	From Bus	To Bus	Circuit	Continuous Rating (MVA 1)	Emergency Rating (MVA 2)
115	ASARCOSR	ASARCO TAP	1	84	99
115	ASARCO TAP	CRUSHER	1	121	142
115	ASARCO TAP	HAYDENAZ	1	121	142
115	BONNEY TAP	COOLIDGE	1	121	142
115	BONNEY TAP	CRUSHER	1	121	142
115	CARLOTA	PINTO VALLEY	1	159	159
115	CARLOTA	SILVERKING 2	1	161	192
115	CARREL	GOLDFIELD	1	160	190
115	CARREL	SPURLOCK	1	161	192
115	ELLISON	ELLISON TAP	1	120	120
115	FRAZIER	HORSMESA	1	161	192
115	FRAZIER	MOONSHINE 2	1	161	192
115	FRAZIER	ROOSEVELT	1	59	59
115	GASCLEAN	ELLISON TAP	1	40	40
115	GOLDFIELD	HORSMESA	1	181	216
115	HAYDENAZ	KEARNY TAP	1	121	142
115	HORSMESA	MORMANFLAT	1	161	192
115	KEARNY TAP	KEARNY	1	121	129
115	KEARNY TAP	MORRISAZ	1	121	142
115	KNOLL	RS-30	1	203	203
115	MIAMI	MIAMI 3	1	203	203
115	MIAMI	PINTO VALLEY	1	159	159
115	MIAMI 3	MIAMI 4	1	159	159
115	MIAMI 3	PINAL	1	121	142
115	MIAMI 4	ELLISON TAP	1	159	159
115	MOONSHINE	MOONSHINE 2	1	120	120
115	MOONSHINE	PINAL	1	161	192
115	MOONSHINE	REFINERY TAP	1	120	120
115	OAKFLAT	SILVERKING TAP 1	1	161	192
115	OAKFLAT	TRASK	1	161	192
115	PINAL	SILVERKING TAP 1	1	161	192
115	RAY	KNOLL	1	342	376
115	RAY	RS-30	1	342	376
115	RAY	SUPERIOR	1	161	192
115	REFINERY	REFINERY TAP	1	40	40
115	REFINERY TAP	ELLISON TAP	1	121	142
115	RS-30	MORRISAZ	1	120	120
115	SILVERKING 1	SILVERKING TAP 1	1	323	369
115	SILVERKING 2	SUPERIOR	1	161	192
115	SPURLOCK	SUPERIOR	1	161	192
115	STEWART MTN TAP	GOLDFIELD	1	195	231
115	STEWART MTN TAP	MORMANFLAT	1	161	192
115	STEWART MTN TAP	STEWART MTN	1	80	80
115	SUPERIOR	TRASK	1	161	192

Voltage (kV)	From Bus	To Bus	Circuit	Continuous Rating (MVA 1)	Emergency Rating (MVA 2)
230	ABEL	DINOSAUR	1	823	904
230	ABEL	PFISTER	1	823	904
230	ABEL	RANDOLPH	1	1056	1255
230	ABEL	SCHRADER	1	823	904
230	AGUAFRIA	ALEXANDR	1	590	661
230	AGUAFRIA	WESTWING WEST	1	773	912
230	AGUAFRIA	WESTWING WEST	2	773	912
230	AGUAFRIA	WHITETANK	1	773	912
230	ANDERSON	KYRENE-WEST	1	781	869
230	BRANDOW	KYRENE-EAST	1	773	912
230	BRANDOW	PAPAGOBUTTE	1	773	912
230	BRANDOW	WARD	2	363	432
230	BRANDOW	WARD	4	363	432
230	BROWNING	SANTAN	1	773	904
230	CORBELL	KYRENE-EAST	1	773	912
230	DINOSAUR	BROWNING	1	823	904
230	KYRENE-EAST	KNOX	1	1195	1502
230	KYRENE-EAST	KYRENE-WEST	1	1195	1195
230	KYRENE-EAST	SCHRADER	1	725	865
230	ORME	ANDERSON	1	773	904
230	ORME	ANDERSON	2	773	904
230	ORME	RUDD	1	781	924
230	ORME	RUDD	2	781	924
230	PAPAGOBUTTE	KYRENE-WEST	1	590	661
230	PAPAGOBUTTE	PINNACLE PEAK SRP	1	590	661
230	PFISTER	SANTAN	1	823	904
230	PINAL CENTRAL	DESERT BASIN	1	823	904
230	PINAL CENTRAL	RANDOLPH	1	1195	1514
230	PINNACLE PEAK SRP	BRANDOW	1	386	456
230	PINNACLE PEAK SRP	BRANDOW	2	386	456
230	ROGERS	ROGERS WAPA	1	797	797
230	ROGERS	ROGERS WAPA	2	797	797
230	ROGERS	THUNDERSTONE	1	770	770
230	RS-27	KNOX	1	1195	1502
230	RS-27	KNOX	2	1195	1502
230	RS-27	RS-28	1	1195	1502
230	RS-27	RS-28	2	1195	1502
230	RUDD	WHITETANK	1	773	912
230	SANTAN	CORBELL	1	725	865
230	SANTAN	ROGERS	1	781	904
230	SANTAN	THUNDERSTONE	1	770	770
230	SCHRADER	RS-28	1	1195	1502
230	SCHRADER	SANTAN	1	773	797
230	SILVERKING	GOLDFIELD	1	645	769
230	SILVERKING	RS-29	1	823	904
230	SILVERKING	RS-29	2	823	904
230	THUNDERSTONE	GOLDFIELD	1	390	462
230	THUNDERSTONE	GOLDFIELD	2	390	462

Voltage (kV)	From Bus	To Bus	Circuit	Continuous Rating (MVA 1)	Emergency Rating (MVA 2)
500	ABEL	BROWNING	1	2971	3551
500	BROWNING	KYRENE	1	2853	2887
500	CORONADO	SUGARLOAF	1	1732	1732
500	CORONADO	SILVERKING	1	1732	2165
500	DUKE	PINAL CENTRAL	1	2971	3551
500	DUKE	PINAL WEST	1	2971	3551
500	HASSYAMPA	ARLINTON	1	2598	2598
500	HASSYAMPA	HARQUAHA	1	2626	2626
500	HASSYAMPA	JOJOBA	1	2971	3551
500	HASSYAMPA	PALOVERDE	1	2823	3360
500	HASSYAMPA	PALOVERDE	2	2971	3551
500	HASSYAMPA	PINAL WEST	1	2971	3551
500	JOJOBA	KYRENE	1	2823	2887
500	PALOVERDE	RUDD	1	2823	3360
500	PALOVERDE	WESTWING	1	2619	3014
500	PALOVERDE	WESTWING	2	2619	3014
500	PINAL CENTRAL	ABEL	1	2971	3551
500	SUGARLOAF	CHOLLA	1	1732	1732
500	SILVERKING	BROWNING	1	2356	2789

Appendix B – WECC TABLE W-1

Name: TPL – (001 thru 004) – WECC – 1 – CR — System Performance Criteria

WECC DISTURBANCE-PERFORMANCE TABLE
OF ALLOWABLE EFFECTS ON OTHER SYSTEMS

NERC and WECC Categories	Outage Frequency Associated with the Performance Category (outage/year)	Transient Voltage Dip Standard	Minimum Transient Frequency Standard	Post Transient Voltage Deviation Standard (See Note 3)
A	Not Applicable	Nothing in addition to NERC		
B	≥ 0.33	Not to exceed **25%** at load buses or **30%** at non-load buses. Not to exceed **20% for more than 20 cycles** at load buses.	Not below **59.6** Hz for 6 cycles or more at a load bus.	Not to exceed **5%** at any bus.
C	0.033 – 0.33	Not to exceed **30%** at any bus. Not to exceed **20% for more than 40 cycles** at load buses.	Not below **59.0** Hz for 6 cycles or more at a load bus.	Not to exceed **10%** at any bus.
D	< 0.033	Nothing in addition to NERC		

Notes:

1. *The WECC Disturbance-Performance Table applies equally to either a system with all elements in service, or a system with one element removed and the system adjusted.*

2. *As an example in applying the WECC Disturbance-Performance Table, a Category B disturbance in one system shall not cause a transient voltage dip in another system that is greater than 20% for more than 20 cycles at load buses, or exceed 25% at load buses or 30% at non-load buses at any time other than during the fault.*

Table W-1

3. *If it can be demonstrated that post transient voltage deviations that are less than the values in the table will result in voltage instability, the system in which the disturbance originated and the affected system(s) shall cooperate in mutually resolving the problem.*

4. *Refer to Figure W-1 for voltage performance parameters.*

5. *Load buses include generating unit auxiliary loads.*

6. *To reach the frequency categories shown in the WECC Disturbance-Performance Table for Category C disturbances, some planned and controlled islanding may occur. Underfrequency load shedding is expected to arrest this frequency decline and assure continued operation within the resulting islands.*

7. *For simulation test cases, the interconnected transmission system steady state loading conditions prior to a disturbance shall be appropriate to the case. Disturbances shall be simulated at locations on the system that result in maximum stress on other systems. Relay action, fault clearing time, and reclosing practice shall be represented in simulations according to the planning and operation of the actual or planned systems. When simulating post transient conditions, actions are limited to automatic devices and no manual action is to be assumed.*

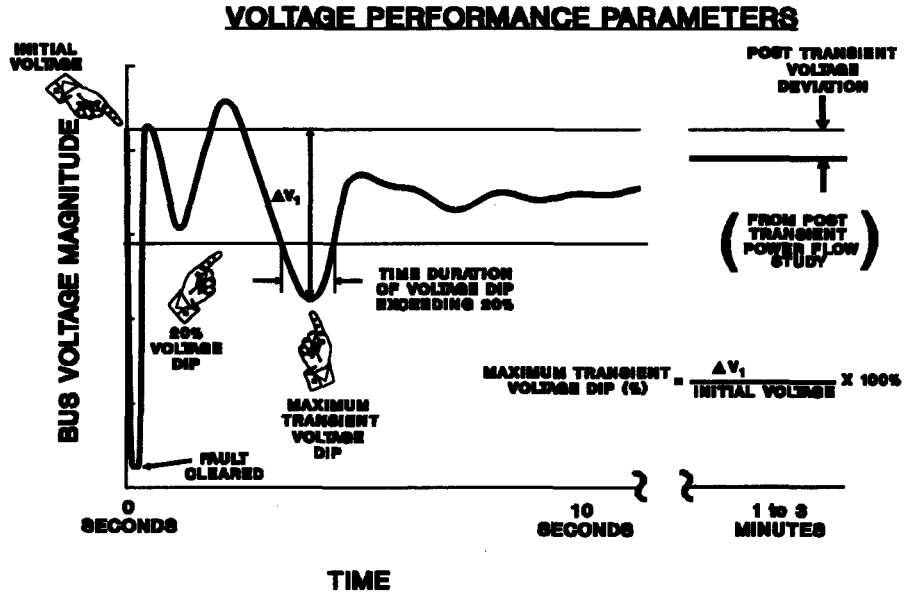


Figure W-1

Appendix C – NERC Criteria for Single Contingencies

Standard TPL-002-0b — System Performance Following Loss of a Single BES Element

Table I. Transmission System Standards — Normal and Emergency Conditions

Category	Contingencies	System Limits or Impacts		
	Initiating Event(s) and Contingency Element(s)	System Stable and both Thermal and Voltage Limits within Applicable Rating [a]	Loss of Demand or Curtailed Firm Transfers	Cascading Outages
A No Contingencies	All Facilities in Service	Yes	No	No
B Event resulting in the loss of a single element.	Single Line Ground (SLG) or 3-Phase (3Ø) Fault, with Normal Clearing: 1. Generator 2. Transmission Circuit 3. Transformer Loss of an Element without a Fault.	Yes Yes Yes Yes	No [b] No [b] No [b] No [b]	No No No No
	Single Pole Block, Normal Clearing [c]: 4. Single Pole (dc) Line	Yes	No [b]	No

Appendix D – Contingency List

Single element contingencies evaluated in the study for year 2023 include:

Line	CHOLLA	500	to	SAGUARO	500	Circuit	1
Line	CHOLLA	500	to	SILVERKG	500	Circuit	1
Line	FOURCORN	500	to	MOENKOPI	500	Circuit	1
Line	MOENKOPI	500	to	YAVAPAI	500	Circuit	1
Line	MOENKOPI	500	to	CEDARMT	500	Circuit	1
Line	MOENKOPI	500	to	ELDORDO	500	Circuit	1
Line	NAVAJO	500	to	MOENKOPI	500	Circuit	1
Line	NAVAJO	500	to	DUGAS	500	Circuit	1
Line	NAVAJO	500	to	CRYSTAL	500	Circuit	1
Line	SAGUARO	500	to	TORTLIT2	500	Circuit	1
Line	SAGUARO	500	to	TORTOLIT	500	Circuit	1
Line	SAGUARO	500	to	TORTOLIT	500	Circuit	2
Line	WESTWING	500	to	MORGAN	500	Circuit	1
Line	WESTWING	500	to	PERKINS	500	Circuit	1
Line	YAVAPAI	500	to	WESTWING	500	Circuit	1
Line	SNVLY	500	to	MORGAN	500	Circuit	1
Line	MORGAN	500	to	PNPKAPS	500	Circuit	
Line	DELANY	500	to	SNVLY	500	Circuit	1
Line	SGRLF	500	to	CHOLLA	500	Circuit	1
Line	DUGAS	500	to	MORGAN	500	Circuit	1
Line	CHOLLA	345	to	PNPKAPS	345	Circuit	1
Line	CHOLLA	345	to	PRECHCYN	345	Circuit	1
Line	CHOLLA	345	to	MAZATZAL	345	Circuit	1
Line	FOURCORN	345	to	CHOLLA	345	Circuit	1
Line	FOURCORN	345	to	CHOLLA	345	Circuit	2
Line	FOURCORN	345	to	SAN_JUAN	345	Circuit	1
Line	FOURCORN	345	to	WESTMESA	345	Circuit	1
Line	FOURCORN	345	to	RIOPUERC	345	Circuit	1
Line	PRECHCYN	345	to	PNPKAPS	345	Circuit	1
Line	MAZATZAL	345	to	PNPKAPS	345	Circuit	1
Line	BUCKEYE	230	to	LIBERTY	230	Circuit	1
Line	CACTUS	230	to	OCOTILLO	230	Circuit	1
Line	CACTUS	230	to	PPAPS N	230	Circuit	1
Line	CASGRAPS	230	to	DBG	230	Circuit	1
Line	CHOLLA	230	to	LEUPP	230	Circuit	1
Line	COCONINO	230	to	VERDE S	230	Circuit	1
Line	CTRYCLUB	230	to	LINCSTRT	230	Circuit	1
Line	CTRYCLUB	230	to	GRNDTRML	230	Circuit	1
Line	DEERVALY	230	to	WESTWNGE	230	Circuit	1
Line	DEERVALY	230	to	ALEXANDR	230	Circuit	1
Line	DEERVALY	230	to	PINPKSRP	230	Circuit	1
Line	EAGLEYE	230	to	BUCKEYE2	230	Circuit	1
Line	EL SOL	230	to	AGUAFRIA	230	Circuit	1
Line	FOURCORN	230	to	PILLAR	230	Circuit	1
Line	GLENDALE	230	to	GRNDTRML	230	Circuit	1
Line	LEUPP	230	to	COCONINO	230	Circuit	1
Line	LINCSTRT	230	to	OCOTILLO	230	Circuit	1
Line	LINCSTRT	230	to	WPHXAPSN	230	Circuit	1
Line	LONEPEAK	230	to	SUNYSLOP	230	Circuit	1
Line	LONEPEAK	230	to	PPAPS E	230	Circuit	1
Line	MEADOWBK	230	to	CTRYCLUB	230	Circuit	1
Line	MEADOWBK	230	to	SUNYSLOP	230	Circuit	1
Line	REACH	230	to	LONEPEAK	230	Circuit	1
Line	REACH	230	to	PPAPS C	230	Circuit	1
Line	PPAPS W	230	to	PPAPS C	230	Circuit	1
Line	PPAPS W	230	to	PINPK	230	Circuit	1

Line	JOJOBA	230	to	PANDA	230	Circuit	1
Line	SAGUARO	230	to	TATMOMLI	230	Circuit	1
Line	SAGUARO	230	to	MILLIGAN	230	Circuit	1
Line	SNTAROSA	230	to	TATMOMLI	230	Circuit	1
Line	SNTAROSA	230	to	TESTTRAK	230	Circuit	1
Line	SNTAROSA	230	to	DBG	230	Circuit	1
Line	SURPRISE	230	to	EL SOL	230	Circuit	1
Line	SURPRISE	230	to	WESTWNGW	230	Circuit	1
Line	WESTWNGW	230	to	EL SOL	230	Circuit	1
Line	WESTWNGW	230	to	WESTWNGE	230	Circuit	1
Line	WESTWNGW	230	to	PINPK	230	Circuit	1
Line	WHTNKAPS	230	to	EL SOL	230	Circuit	1
Line	WHTNKAPS	230	to	RUDD	230	Circuit	1
Line	WPHXAPSS	230	to	WPHXAPSN	230	Circuit	1
Line	WPHXAPSS	230	to	RUDD	230	Circuit	1
Line	YAVAPAI	230	to	VERDE N	230	Circuit	1
Line	YAVAPAI	230	to	WILOWLKE	230	Circuit	1
Line	KYR-WEST	230	to	OCOTILLO	230	Circuit	1
Line	KYR-WEST	230	to	KNOX	230	Circuit	1
Line	PANDA	230	to	GILABEND	230	Circuit	1
Line	WPHXAPSN	230	to	WHTNKAPS	230	Circuit	1
Line	FORTROCK	230	to	ROUNDVLY	230	Circuit	1
Line	FORTROCK	230	to	JUNIPRMT	230	Circuit	1
Line	RACEWAY	230	to	RACEWYWA	230	Circuit	1
Line	VERDE S	230	to	VERDE N	230	Circuit	1
Line	GLENDALW	230	to	GLENDALE	230	Circuit	1
Line	GLENDALW	230	to	AGUAFRIA	230	Circuit	1
Line	WILOWLKW	230	to	PRESCOTT	230	Circuit	1
Line	WILOWLKW	230	to	WILOWLKE	230	Circuit	1
Line	AVERY	230	to	RACEWAY	230	Circuit	1
Line	AVERY	230	to	SCTWSH	230	Circuit	1
Line	TRLBY	230	to	TS2	230	Circuit	1
Line	TRLBY	230	to	SNVLY	230	Circuit	1
Line	TS2	230	to	PLMVLY	230	Circuit	1
Line	SCTWSH	230	to	PPAPS W	230	Circuit	1
Line	TS4	230	to	JOJOBA	230	Circuit	1
Line	TS4	230	to	PLMVLY	230	Circuit	1
Line	PPAPS C	230	to	PPAPS E	230	Circuit	1
Line	JUNIPRMT	230	to	SELIGMAN	230	Circuit	1
Line	MILLIGAN	230	to	CASGRAPS	230	Circuit	1
Line	PPAPS N	230	to	OCOTILLO	230	Circuit	1
Line	PPAPS N	230	to	PPAPS E	230	Circuit	1
Line	PPAPS N	230	to	PINPKSRP	230	Circuit	1
Line	PPAPS N	230	to	PINPKSRP	230	Circuit	2
Line	ADAMS	115	to	ADAMS TP	115	Circuit	1
Line	BONNYBKE	115	to	BONNYBRK	115	Circuit	1
Line	SAG.EAST	115	to	SAG.WEST	115	Circuit	1
Line	SAG.EAST	115	to	ORACLE	115	Circuit	1
Line	SAG.EAST	115	to	MARANATP	115	Circuit	1
Line	SAG.WEST	115	to	SNMANUEL	115	Circuit	1
Line	SAG.WEST	115	to	ED-5	115	Circuit	1
Line	SAG.WEST	115	to	ED-5	115	Circuit	2
Line	VLYFARMS	115	to	ORACLE	115	Circuit	1
Line	CORONADO	500	to	SGRLF	500	Circuit	1
Line	CORONADO	500	to	SILVERKG	500	Circuit	1
Line	PALOVRDE	500	to	WESTWING	500	Circuit	1
Line	PALOVRDE	500	to	WESTWING	500	Circuit	2
Line	PALOVRDE	500	to	DELANY	500	Circuit	1
Line	PALOVRDE	500	to	RUDD	500	Circuit	1
Line	PALOVRDE	500	to	COLRIVER	500	Circuit	1
Line	PERKINPS	500	to	WESTWING	500	Circuit	1
Line	PERKINPS	500	to	PERKINS	500	Circuit	1
Line	SILVERKG	500	to	SAGUARO	500	Circuit	1
Line	SILVERKG	500	to	BROWNING	500	Circuit	1

Line	BROWNING	500	to	KYRENE	500	Circuit	1
Line	ABEL	500	to	BROWNING	500	Circuit	1
Line	PINAL_C	500	to	ABEL	500	Circuit	1
Line	PINAL_C	500	to	TORTOLIT	500	Circuit	1
Line	DUKE	500	to	PINAL_C	500	Circuit	1
Line	DUKE	500	to	PINAL_W	500	Circuit	1
Line	JOJOBA	500	to	GILARIVR	500	Circuit	1
Line	JOJOBA	500	to	GILARIVR	500	Circuit	2
Line	JOJOBA	500	to	KYRENE	500	Circuit	1
Line	HASSYAMP	500	to	PALOVRDE	500	Circuit	1
Line	HASSYAMP	500	to	PALOVRDE	500	Circuit	2
Line	HASSYAMP	500	to	PALOVRDE	500	Circuit	3
Line	HASSYAMP	500	to	PINAL_W	500	Circuit	1
Line	HASSYAMP	500	to	JOJOBA	500	Circuit	1
Line	HASSYAMP	500	to	ARLINTON	500	Circuit	1
Line	HASSYAMP	500	to	HARQUAHA	500	Circuit	1
Line	HASSYAMP	500	to	HDWSH	500	Circuit	1
Line	ASARCOSR	115	to	ASARCOTP	115	Circuit	1
Line	ASARCOTP	115	to	HAYDENAZ	115	Circuit	1
Line	ASARCOTP	115	to	CRUSHER	115	Circuit	1
Line	BONNEYTP	115	to	BONNYBRK	115	Circuit	1
Line	BONNEYTP	115	to	CRUSHER	115	Circuit	1
Line	BONNEYTP	115	to	COOLIDGE	115	Circuit	1
Line	CARLOTA	115	to	PINTOVLY	115	Circuit	1
Line	CARLOTA	115	to	SILVERK2	115	Circuit	1
Line	ELLISON	115	to	ELLISOTP	115	Circuit	1
Line	FRAZIER	115	to	HORSMESA	115	Circuit	1
Line	FRAZIER	115	to	MOONSHI2	115	Circuit	1
Line	FRAZIER	115	to	ROOSEVLT	115	Circuit	1
Line	GOLDFELD	115	to	HORSMESA	115	Circuit	1
Line	HAYDENAZ	115	to	KEARNYTP	115	Circuit	1
Line	HORSMESA	115	to	MRMNFLAT	115	Circuit	1
Line	GASCLEAN	115	to	ELLISOTP	115	Circuit	1
Line	KEARNYTP	115	to	MORRISAZ	115	Circuit	1
Line	KNOLL	115	to	RS-30	115	Circuit	1
Line	MIAMI	115	to	PINTOVLY	115	Circuit	1
Line	MIAMI	115	to	MIAMI 3	115	Circuit	1
Line	MOONSHIN	115	to	MOONSHI2	115	Circuit	1
Line	MOONSHIN	115	to	PINAL	115	Circuit	1
Line	MOONSHIN	115	to	REFINETP	115	Circuit	1
Line	OAKFLAT	115	to	SILVERT1	115	Circuit	1
Line	OAKFLAT	115	to	TRASK	115	Circuit	1
Line	PINAL	115	to	SILVERT1	115	Circuit	1
Line	RAY	115	to	RS-30	115	Circuit	1
Line	RS-30	115	to	MORRISAZ	115	Circuit	1
Line	RAY	115	to	SUPERIOR	115	Circuit	1
Line	RAY	115	to	KNOLL	115	Circuit	1
Line	REFINERY	115	to	REFINETP	115	Circuit	1
Line	SILVERK1	115	to	SILVERT1	115	Circuit	1
Line	SILVERK2	115	to	SUPERIOR	115	Circuit	1
Line	SPURLOCK	115	to	SUPERIOR	115	Circuit	1
Line	SUPERIOR	115	to	TRASK	115	Circuit	1
Line	CARREL	115	to	GOLDFELD	115	Circuit	1
Line	CARREL	115	to	SPURLOCK	115	Circuit	1
Line	REFINETP	115	to	ELLISOTP	115	Circuit	1
Line	MIAMI 4	115	to	ELLISOTP	115	Circuit	1
Line	MIAMI 3	115	to	PINAL	115	Circuit	1
Line	MIAMI 3	115	to	MIAMI 4	115	Circuit	1
Line	STWMTNTP	115	to	GOLDFELD	115	Circuit	1
Line	STWMTNTP	115	to	MRMNFLAT	115	Circuit	1
Line	STWMTNTP	115	to	STEWMTN	115	Circuit	1
Line	MESQUITE	230	to	C643T	230	Circuit	1
Line	MESQUITE	230	to	C643T	230	Circuit	2
Line	AGUAFRIA	230	to	WESTWNGW	230	Circuit	1

Line	AGUAFRIA	230	to	WESTWNGW	230	Circuit	2
Line	AGUAFRIA	230	to	ALEXANDR	230	Circuit	1
Line	AGUAFRIA	230	to	WHITETNK	230	Circuit	1
Line	ANDERSON	230	to	KYR-WEST	230	Circuit	1
Line	BRANDOW	230	to	KYR-EAST	230	Circuit	1
Line	BRANDOW	230	to	PAPAGOBT	230	Circuit	1
Line	BRANDOW	230	to	WARD	230	Circuit	2
Line	BRANDOW	230	to	WARD	230	Circuit	4
Line	CORBELL	230	to	KYR-EAST	230	Circuit	1
Line	KYR-EAST	230	to	SCHRADER	230	Circuit	1
Line	KYR-EAST	230	to	KNOX	230	Circuit	1
Line	ORME	230	to	ANDERSON	230	Circuit	1
Line	ORME	230	to	ANDERSON	230	Circuit	2
Line	ORME	230	to	RUDD	230	Circuit	1
Line	ORME	230	to	RUDD	230	Circuit	2
Line	PAPAGOBT	230	to	KYR-WEST	230	Circuit	1
Line	PAPAGOBT	230	to	PINPKSRP	230	Circuit	1
Line	PINPKSRP	230	to	BRANDOW	230	Circuit	1
Line	PINPKSRP	230	to	BRANDOW	230	Circuit	2
Line	ROGERS	230	to	THUNDRST	230	Circuit	1
Line	SANTAN	230	to	CORBELL	230	Circuit	1
Line	SANTAN	230	to	ROGERS	230	Circuit	1
Line	SANTAN	230	to	THUNDRST	230	Circuit	1
Line	RS-27	230	to	RS-28	230	Circuit	1
Line	RS-27	230	to	RS-28	230	Circuit	2
Line	RS-27	230	to	KNOX	230	Circuit	1
Line	RS-27	230	to	KNOX	230	Circuit	2
Line	SCHRADER	230	to	SANTAN	230	Circuit	1
Line	SCHRADER	230	to	RS-28	230	Circuit	1
Line	SILVERKG	230	to	GOLDFELD	230	Circuit	1
Line	THUNDRST	230	to	GOLDFELD	230	Circuit	1
Line	THUNDRST	230	to	GOLDFELD	230	Circuit	2

Line	KNOX	230	to	SNTAROSA	230	Circuit	1
Line	BROWNING	230	to	SANTAN	230	Circuit	1
Line	DINOSAUR	230	to	BROWNING	230	Circuit	1
Line	ABEL	230	to	SCHRADER	230	Circuit	1
Line	ABEL	230	to	DINOSAUR	230	Circuit	1
Line	ABEL	230	to	PFISTER	230	Circuit	1
Line	ABEL	230	to	RANDOLPH	230	Circuit	1
Line	PFISTER	230	to	SANTAN	230	Circuit	1
Line	RUDD	230	to	PLMVLY	230	Circuit	1
Line	RUDD	230	to	WHITETNK	230	Circuit	1
Line	PINAL_C	230	to	RANDOLPH	230	Circuit	1
Line	PINAL_C	230	to	DBG	230	Circuit	1
Line	NOGALES	138	to	KANTOR	138	Circuit	1
Line	KANTOR	138	to	CANEZ	138	Circuit	1
Line	KANTOR	138	to	TUBAC	138	Circuit	1
Line	CANEZ	138	to	SONOITA	138	Circuit	1
Line	SONOITA	138	to	VALNCIA	138	Circuit	1
Line	GATEWAY	138	to	VALNCIA	138	Circuit	1
Line	TUBAC	138	to	CANEZ	138	Circuit	1
Line	COPPERVR	230	to	FRISCO	230	Circuit	1
Line	PD-MORNC	230	to	FRISCO	230	Circuit	1
Line	APACHE	115	to	HAYDENAZ	115	Circuit	1
Line	APACHE	230	to	BUTERFLD	230	Circuit	1
Line	APACHE	230	to	RED TAIL	230	Circuit	1
Line	APACHE	230	to	WINCHSTR	230	Circuit	1
Line	AVRA	115	to	SNDARIO	115	Circuit	1
Line	BICKNELL	345	to	VAIL	345	Circuit	1
Line	BICKNELL	115	to	THREEPNT	115	Circuit	1
Line	BUTERFLD	230	to	PANTANO	230	Circuit	1
Line	BUTERFLD	230	to	SAN RAF	230	Circuit	1
Line	DOSCONDO	230	to	HACKBERY	230	Circuit	1
Line	MARANA	115	to	AVRA	115	Circuit	1

Line	MORENCI	230	to	PD-MORNC	230	Circuit	1
Line	MORENCI	230	to	GREEN-SW	230	Circuit	1
Line	PANTANO	115	to	KARTCHNR	115	Circuit	1
Line	PANTANO	230	to	NEWTUCSN	230	Circuit	1
Line	RED TAIL	230	to	DOSCONDO	230	Circuit	1
Line	THREEPNT	115	to	VALEN-SW	115	Circuit	1
Line	THREEPNT	115	to	SNDARIO	115	Circuit	1
Line	HACKBERY	230	to	MORENCI	230	Circuit	1
Line	SAHUARIT	230	to	BICKNELL	230	Circuit	1
Line	S.BRKRCH	115	to	SNMANUEL	115	Circuit	1
Line	NEWTUCSN	230	to	SAHUARIT	230	Circuit	1
Line	MEAD N	230	to	HVRA3A4	230	Circuit	1
Line	MEAD N	230	to	ARDEN	230	Circuit	1
Line	MEAD N	230	to	EASTSIDE	230	Circuit	1
Line	MEAD N	230	to	NEWPORT	230	Circuit	1
Line	MEAD N	230	to	EQUEST	230	Circuit	2
Line	MEAD N	230	to	SINATRA	230	Circuit	1
Line	MEAD S	230	to	MEAD N	230	Circuit	1
Line	MEAD S	230	to	MCCULLGH	230	Circuit	1
Line	MEAD S	230	to	MCCULLGH	230	Circuit	2
Line	MEAD S	230	to	PAHRUMP	230	Circuit	1
Line	MEAD S	230	to	EQUEST	230	Circuit	1
Line	MEAD S	230	to	GREENWAY	230	Circuit	1
Line	MEAD S	230	to	ELDORDO	230	Circuit	1
Line	MEAD S	230	to	ELDORDO	230	Circuit	2
Line	BLYTHE	161	to	GLT TAP	161	Circuit	1
Line	BLYTHE	161	to	HEADGATE	161	Circuit	1
Line	BLYTHE	161	to	BLYTHEAZ	161	Circuit	1
Line	BLYTHE	161	to	NILAND	161	Circuit	1
Line	BLYTHE	161	to	BLYTHESC	161	Circuit	1
Line	DAVIS	230	to	RIVIERA	230	Circuit	1
Line	DAVIS	230	to	MEAD N	230	Circuit	1
Line	DAVIS	230	to	LONGTIN	230	Circuit	1
Line	DAVIS	230	to	TOPOCK	230	Circuit	2
Line	DAVIS	230	to	MCCULLGH	230	Circuit	1
Line	HOVRA5A6	230	to	MEAD S	230	Circuit	1
Line	HOVRA7-9	230	to	MEAD S	230	Circuit	1
Line	MEAD	500	to	WESTWING	500	Circuit	1
Line	MEAD	500	to	PERKINS	500	Circuit	1
Line	MEAD	500	to	MARKETPL	500	Circuit	1
Line	PARKER	161	to	BLYTHE	161	Circuit	1
Line	PARKER	161	to	BOUSE	161	Circuit	1
Line	PARKER	161	to	HEADGATE	161	Circuit	1
Line	PARKER	161	to	PARKERAZ	161	Circuit	1
Line	PARKER	230	to	EAGLEYE	230	Circuit	1
Line	PARKER	230	to	BLK MESA	230	Circuit	1
Line	PARKER	230	to	HAVASU	230	Circuit	1
Line	PARKER	230	to	HARCUVAR	230	Circuit	1
Line	PARKER	230	to	GENE	230	Circuit	1
Line	COOLIDGE	115	to	VLYFARMS	115	Circuit	1
Line	COOLIDGE	115	to	ED-2	115	Circuit	1
Line	COOLIDGE	115	to	SIGNAL	115	Circuit	1
Line	COOLIDGE	115	to	COOLDGAZ	115	Circuit	1
Line	COOLIDGE	230	to	SUN ARIZ	230	Circuit	1
Line	COOLIDGE	230	to	SUN ARIZ	230	Circuit	2
Line	BOUSE	161	to	KOFA	161	Circuit	1
Line	BOUSE	161	to	BLACK PK	161	Circuit	1
Line	DEL BAC	115	to	NOGALES	115	Circuit	1
Line	EMPIRE	115	to	CASAGRND	115	Circuit	1
Line	GILA	161	to	KNOB	161	Circuit	1
Line	GILA	161	to	DOME TAP	161	Circuit	1
Line	KNOB	161	to	PILOTKNB	161	Circuit	1
Line	LIBERTY	230	to	WESTWNGW	230	Circuit	1
Line	LIBERTY	230	to	TS4	230	Circuit	1

Line	LIBERTY	230	to	RUDD	230	Circuit	2
Line	LIBERTY	230	to	LIBTYPHS	230	Circuit	1
Line	LIBERTY	230	to	LONE BUT	230	Circuit	1
Line	LIBERTY	230	to	PHXWAPA	230	Circuit	1
Line	LIBERTY	345	to	PEACOCK	345	Circuit	1
Line	LONE BUT	230	to	TESTTRAK	230	Circuit	1
Line	LONE BUT	230	to	SUN ARIZ	230	Circuit	1
Line	MCCONICO	230	to	DAVIS	230	Circuit	1
Line	MCCONICO	230	to	GRIFFITH	230	Circuit	1
Line	MCCONICO	230	to	HARRIS	230	Circuit	1
Line	ORACLE	115	to	S.BRKRCH	115	Circuit	1
Line	ORACLE	115	to	ORACLEAZ	115	Circuit	1
Line	ADAMS TP	115	to	APACHE	115	Circuit	1
Line	ADAMS TP	115	to	NOGALES	115	Circuit	1
Line	PHXWAPA	230	to	LONE BUT	230	Circuit	1
Line	PINPK	230	to	PINPKSRP	230	Circuit	1
Line	PINPK	230	to	PINPKSRP	230	Circuit	2
Line	WLTNMOHK	161	to	GILA	161	Circuit	1
Line	WLTNMOHK	161	to	DOME TAP	161	Circuit	1
Line	TUCSON	115	to	DEL BAC	115	Circuit	1
Line	TUCSON	115	to	ORACLE	115	Circuit	1
Line	ED-2	115	to	SIGNAL	115	Circuit	1
Line	ED-2	115	to	ED-4	115	Circuit	1
Line	ED-2	115	to	BRADY	115	Circuit	1
Line	ED-5	115	to	EMPIRE	115	Circuit	1
Line	TESTTRAK	230	to	CASAGRND	230	Circuit	1
Line	TESTTRAK	230	to	ED5-230	230	Circuit	1
Line	ED-4	115	to	ED-5	115	Circuit	1
Line	HILLTOP	230	to	MCCONICO	230	Circuit	1
Line	N.HAVASU	230	to	PARKER	230	Circuit	1
Line	N.HAVASU	230	to	TOPOCK	230	Circuit	1
Line	HOVRN7N8	230	to	MEAD S	230	Circuit	1
Line	HOVRN5N6	230	to	MEAD S	230	Circuit	1
Line	HOVRN3N4	230	to	MEAD S	230	Circuit	1
Line	HOVRN1N2	230	to	MEAD S	230	Circuit	1
Line	HOVRA1A2	230	to	MEAD S	230	Circuit	1
Line	KOFA	161	to	DOME TAP	161	Circuit	1
Line	GLT TAP	161	to	KNOB	161	Circuit	1
Line	PRSCOTWA	230	to	PRESCOTT	230	Circuit	1
Line	PRSCOTWA	230	to	RNDVLYTP	230	Circuit	1
Line	GAVLINWA	230	to	GAVILNPK	230	Circuit	1
Line	GAVLINWA	230	to	PINPK	230	Circuit	1
Line	GAVLINWA	230	to	PRSCOTWA	230	Circuit	1
Line	RACEWYWA	230	to	WESTWNGE	230	Circuit	1
Line	BLACKMTN	115	to	DEL BAC	115	Circuit	1
Line	BLACKMTN	115	to	SNYDHILL	115	Circuit	1
Line	BLACKMTN	115	to	BLKMTNAZ	115	Circuit	1
Line	BRADY	115	to	PICACHOW	115	Circuit	1
Line	BRADY	115	to	BRADYAZ	115	Circuit	1
Line	BRAWLEY	115	to	SANXAVER	115	Circuit	1
Line	BRAWLEY	115	to	BRAWLYAZ	115	Circuit	1
Line	HARCUVAR	230	to	HASSYTAP	230	Circuit	1
Line	HARCUVAR	230	to	HARCU AZ	230	Circuit	1
Line	N.WADDEL	230	to	RACEWYWA	230	Circuit	1
Line	PICACHOW	115	to	RED ROCK	115	Circuit	1
Line	PICACHOW	115	to	PICACHAZ	115	Circuit	1
Line	RATTLSNK	115	to	TUCSON	115	Circuit	1
Line	RATTLSNK	115	to	TWINPEAK	115	Circuit	1
Line	RED ROCK	115	to	SAG.EAST	115	Circuit	1
Line	RED ROCK	115	to	REDRCKAZ	115	Circuit	1
Line	SANDARIO	115	to	BRAWLEY	115	Circuit	1
Line	SANDARIO	115	to	SANDARAZ	115	Circuit	1
Line	SANXAVER	115	to	SNYDHILL	115	Circuit	1
Line	SANXAVER	115	to	SANXAVAZ	115	Circuit	1

Line	SNYDHILL	115	to	SNYDHLAZ	115	Circuit	1
Line	SPKHILTP	230	to	COOLIDGE	230	Circuit	1
Line	TWINPEAK	115	to	SANDARIO	115	Circuit	1
Line	TWINPEAK	115	to	TWINPKAZ	115	Circuit	1
Line	LONGTIN	230	to	TOPOCK	230	Circuit	1
Line	GRIFFITH	230	to	PEACOCK	230	Circuit	1
Line	PEACOCK	230	to	HILLTOP	230	Circuit	1
Line	PEACOCK	345	to	MEAD	345	Circuit	1
Line	TOPOCK	230	to	BLK MESA	230	Circuit	1
Line	TOPOCK	230	to	SOPOINT	230	Circuit	1
Line	TOPOCK	230	to	SOPOINT	230	Circuit	2
Line	SUN ARIZ	230	to	PINAL_C	230	Circuit	1
Line	HASSYTAP	230	to	LIBERTY	230	Circuit	1
Line	HASSYTAP	230	to	HASSY AZ	230	Circuit	1
Line	RNDVLYTP	230	to	ROUNDVLY	230	Circuit	1
Line	RNDVLYTP	230	to	PEACOCK	230	Circuit	1
Line	ROGSWAPA	230	to	PINPK	230	Circuit	1
Line	ROGSWAPA	230	to	PINPK	230	Circuit	2
Line	ROGSWAPA	230	to	SPKHILTP	230	Circuit	1
Line	TURLY_S	115	to	BLANCO	115	Circuit	1
Line	GALLEGOS	115	to	BERGIN	115	Circuit	1
Line	ANIMAS	115	to	SULLIVAN	115	Circuit	1
Line	ANIMAS	115	to	BLUFVIEW	115	Circuit	1
Line	BERGIN	115	to	LAKEVIEW	115	Circuit	1
Line	BERGIN	115	to	WESTFORK	115	Circuit	1
Line	FOOTHILS	115	to	HOODMESA	115	Circuit	1
Line	FOOTHILS	115	to	LAKEVIEW	115	Circuit	1
Line	FRUITAP	115	to	FRUITLND	115	Circuit	1
Line	FRUITAP	115	to	HOODMESA	115	Circuit	1
Line	GLADETAP	115	to	LAPLATA	115	Circuit	1
Line	GLADETAP	115	to	BLKGLADS	115	Circuit	1
Line	NAVAJO	115	to	SAN JUAN	115	Circuit	1
Line	BLUFVIEW	115	to	MESA FM	115	Circuit	1
Line	COLLTAP	115	to	HOODMESA	115	Circuit	1
Line	COLLTAP	115	to	SULLIVAN	115	Circuit	1
Line	COLLTAP	115	to	COLLEG	115	Circuit	1
Line	HARE	115	to	TURLY_S	115	Circuit	1
Line	HARE	115	to	WESTFORK	115	Circuit	1
Line	HARE	115	to	MILAGR	115	Circuit	1
Line	HARE	115	to	ENRON	115	Circuit	1
Line	HARTCYN	115	to	GLADETAP	115	Circuit	1
Line	HARTCYN	115	to	H-H	115	Circuit	1
Line	H-H	115	to	HARE	115	Circuit	1
Line	WESTLOOP	115	to	HOGBAK	115	Circuit	1
Line	WESTLOOP	115	to	GLADETAP	115	Circuit	1
Line	WESTLOOP	115	to	HOODMESA	115	Circuit	1
Line	WESTLOOP	115	to	MESA FM	115	Circuit	1
Line	WESTLOOP	115	to	PRAXAR	115	Circuit	1
Line	A-R	115	to	TURLY_S	115	Circuit	1
Line	A-R	115	to	SAN JUAN	115	Circuit	1
Line	FLAGSTAF	345	to	GLENCANY	345	Circuit	1
Line	FLAGSTAF	345	to	GLENCANY	345	Circuit	2
Line	FLAGSTAF	345	to	PINPKBRB	345	Circuit	1
Line	FLAGSTAF	345	to	PINPKBRB	345	Circuit	2
Line	GLEN PS	230	to	NAVAJO	230	Circuit	1
Line	KAYENTA	230	to	SHIPROCK	230	Circuit	1
Line	KAYENTA	230	to	LNGHOUSE	230	Circuit	1
Line	SHIPROCK	115	to	FRUITAP	115	Circuit	1
Line	SHIPROCK	115	to	PRAXAR	115	Circuit	1
Line	SHIPROCK	345	to	FOURCORN	345	Circuit	1
Line	SHIPROCK	345	to	SAN_JUAN	345	Circuit	1
Line	NAVAJO	230	to	LNGHOUSE	230	Circuit	1
Line	CEDARMT	500	to	YAVAPAI	500	Circuit	1
Line	Q043B1	500	to	HDWSH	500	Circuit	1

Line	Q043B2	500	to	HDWSH	500	Circuit	1
Line	CEDARMT2	138	to	CEDARMT3	138	Circuit	1
Line	Q044	230	to	PANDA	230	Circuit	1
Line	HIDALGO	345	to	GREENLEE	345	Circuit	1
Line	MACHO_SPRNGS	345	to	SPRINGR	345	Circuit	1
Line	HENDRSON	230	to	MEAD N	230	Circuit	1
Line	BC TAP	230	to	MEAD N	230	Circuit	1
Line	H ALLEN	500	to	MEAD	500	Circuit	1
Line	SAN_JUAN	345	to	MCKINLEY	345	Circuit	1
Line	SAN_JUAN	345	to	MCKINLEY	345	Circuit	2
Line	PINTO PS	345	to	FOURCORN	345	Circuit	1
Line	SIGURDPS	230	to	GLENCANY	230	Circuit	1
Line	CAMINO	230	to	MEAD S	230	Circuit	E
Line	CAMINO	230	to	MEAD S	230	Circuit	W
Line	BLKGLADE	230	to	SHIPROCK	230	Circuit	1
Line	GREENLEE	345	to	COPPERVR	345	Circuit	1
Line	GREENLEE	345	to	WILLOW	345	Circuit	1
Line	GREENLEE	345	to	WINCHSTR	345	Circuit	1
Line	MCKINLEY	345	to	SPRINGR	345	Circuit	1
Line	MCKINLEY	345	to	SPRINGR	345	Circuit	2
Line	PINALWES	345	to	SOUTH	345	Circuit	1
Line	SPRINGR	345	to	CORONADO	345	Circuit	1
Line	SPRINGR	345	to	GREENLEE	345	Circuit	1
Line	SPRINGR	345	to	VAIL2	345	Circuit	1
Line	TORTOLIT	345	to	NLOOP345	345	Circuit	1
Line	VAIL	345	to	SOUTH	345	Circuit	1
Line	WESTWING	345	to	PINALWES	345	Circuit	1
Line	WILLOW	345	to	BOWIE	345	Circuit	1
Line	WILLOW	345	to	BOWIE	345	Circuit	2
Line	WINCHSTR	345	to	VAIL	345	Circuit	1
Line	WINCHSTR	345	to	WILLOW	345	Circuit	1
Line	CANOARCH	138	to	CLEAR	138	Circuit	1
Line	CIENEGA	138	to	S.TRAIL	138	Circuit	1
Line	CORONA	138	to	IRV_RING	138	Circuit	1
Line	CORONA	138	to	SOUTH	138	Circuit	1
Line	CRYCROFT	138	to	NE.LOOP	138	Circuit	1
Line	CYPRUS	138	to	CLEAR	138	Circuit	1
Line	DELCERRO	138	to	WESTINA	138	Circuit	1
Line	DMP	138	to	ANKLAM	138	Circuit	1
Line	DMP	138	to	N. LOOP	138	Circuit	1
Line	DMP	138	to	NE.LOOP	138	Circuit	1
Line	DMP	138	to	NL. EXP	138	Circuit	1
Line	DMP	138	to	SN.CRUZ	138	Circuit	1
Line	DMP	138	to	TUCSON	138	Circuit	1
Line	DREXEL	138	to	IRVNGTN	138	Circuit	1
Line	DREXEL	138	to	MIDVALE	138	Circuit	1
Line	E. LOOP	138	to	HARRISON	138	Circuit	1
Line	E. LOOP	138	to	NE.LOOP	138	Circuit	1
Line	E. LOOP	138	to	PANTANO	138	Circuit	1
Line	E. LOOP	138	to	ROBERTS	138	Circuit	1
Line	GREENVLY	138	to	CANOARCH	138	Circuit	1
Line	HARTT	138	to	GREENVLY	138	Circuit	1
Line	IRVNGTN	138	to	TECHPARK	138	Circuit	1
Line	IRVNGTN	138	to	TUCSON	138	Circuit	1
Line	IRVNGTN	138	to	VAIL	138	Circuit	2
Line	IRV_RING	138	to	KINO	138	Circuit	1
Line	IRV_RING	138	to	SOUTH	138	Circuit	1
Line	LOSREALS	138	to	VAIL	138	Circuit	1
Line	MIDVALE	138	to	MEDINA	138	Circuit	1
Line	MIDVALE	138	to	SPNCER	138	Circuit	1
Line	N. LOOP	138	to	NL. EXP	138	Circuit	1
Line	NE.LOOP	138	to	NELP_SVC	138	Circuit	1
Line	NE.LOOP	138	to	RILLITO	138	Circuit	1
Line	NL. EXP	138	to	MARANA	138	Circuit	1

Line	NL. EXP	138	to	NARANJA	138	Circuit	1
Line	NL. EXP	138	to	RANVISTO	138	Circuit	1
Line	NL. EXP	138	to	RILLITO	138	Circuit	1
Line	NL. EXP	138	to	WESTINA	138	Circuit	1
Line	ORNGROVE	138	to	EASTINA	138	Circuit	1
Line	ORNGROVE	138	to	LACANADA	138	Circuit	1
Line	ORNGROVE	138	to	RILLITO	138	Circuit	1
Line	PANTANO	138	to	LOSREALS	138	Circuit	1
Line	RANVISTO	138	to	LACANADA	138	Circuit	1
Line	RANVISTO	138	to	NARANJA	138	Circuit	1
Line	RAYTHEON	138	to	MEDINA	138	Circuit	1
Line	RBWILMOT	138	to	IRVNGTN	138	Circuit	1
Line	RBWILMOT	138	to	VAIL	138	Circuit	1
Line	RILLITO	138	to	LACANADA	138	Circuit	1
Line	ROBERTS	138	to	HARRISON	138	Circuit	1
Line	S.TRAIL	138	to	ROBERTS	138	Circuit	1
Line	SN.CRUZ	138	to	ANKLAM	138	Circuit	1
Line	SN.CRUZ	138	to	IRVNGTN	138	Circuit	1
Line	SNYDER	138	to	CRYCROFT	138	Circuit	1
Line	SNYDER	138	to	E. LOOP	138	Circuit	1
Line	SNYDER	138	to	NE.LOOP	138	Circuit	1
Line	SOUTH	138	to	ASARCO	138	Circuit	1
Line	SOUTH	138	to	CLEAR	138	Circuit	1
Line	SOUTH	138	to	CYPRUS	138	Circuit	1
Line	SOUTH	138	to	GREENVLY	138	Circuit	1
Line	SOUTH	138	to	MEDINA	138	Circuit	1
Line	SOUTH	138	to	MIDVALE	138	Circuit	1
Line	SOUTH	138	to	RAYTHEON	138	Circuit	1
Line	SOUTH	138	to	TORO	138	Circuit	1
Line	SPNCER	138	to	MEDINA	138	Circuit	1
Line	TECHPARK	138	to	VAIL	138	Circuit	1
Line	TORO	138	to	GREENVLY	138	Circuit	1
Line	TORO	138	to	HARTT	138	Circuit	1
Line	TORO	138	to	ROSEMONT	138	Circuit	1
Line	TORTOLIT	138	to	MARANA	138	Circuit	1
Line	TORTOLIT	138	to	N. LOOP	138	Circuit	3
Line	TORTOLIT	138	to	N. LOOP	138	Circuit	4
Line	TORTOLIT	138	to	NARANJA	138	Circuit	1
Line	TORTOLIT	138	to	NL. EXP	138	Circuit	1
Line	TORTOLIT	138	to	NL. EXP	138	Circuit	2
Line	TORTOLIT	138	to	NL. EXP	138	Circuit	3
Line	TORTOLIT	138	to	NL. EXP	138	Circuit	4
Line	TORTOLIT	138	to	RANVISTO	138	Circuit	1
Line	TUCSON	138	to	DELCERRO	138	Circuit	1
Line	TUCSON	138	to	KINO	138	Circuit	1
Line	TWNTYSEC	138	to	E. LOOP	138	Circuit	1
Line	TWNTYSEC	138	to	IRVNGTN	138	Circuit	1
Line	UA MED	138	to	KINO	138	Circuit	1
Line	UA MED	138	to	TUCSON	138	Circuit	1
Line	VAIL	138	to	NOGALES	138	Circuit	1
Line	VAIL	138	to	CIENEGA	138	Circuit	1
Line	VAIL	138	to	FT.HUACH	138	Circuit	1
Line	MARANATP	115	to	MARANA	115	Circuit	1
Line	MARANATP	115	to	RATTLSNK	115	Circuit	1
Line	BUCKEYE2	230	to	BUCKEYE	230	Circuit	1
Line	BUCKEYE2	230	to	LIBERTY	230	Circuit	1
Line	BOOTHILL	115	to	ADAMS	115	Circuit	1
Line	BOOTHILL	115	to	MURAL	115	Circuit	1
Line	N.GILA	230	to	ORCHRD	230	Circuit	1
Line	SELIGMAN	230	to	N06	230	Circuit	1
Line	FLAGSTAF	345	to	YOUNGSCY	345	Circuit	1
Line	BAGCAP	115	to	BAGDAD	115	Circuit	1
Line	BAGDTWN	115	to	BAGCAP	115	Circuit	1
Line	PRESCOTT	115	to	BAGDTWN	115	Circuit	1

Line	HASSYAMP	500	to	N.GILA	500	Circuit	2
Line	AVSOLAR	115	to	AVSOLAR2	115	Circuit	1
Line	SILVERKG	230	to	RS-29	230	Circuit	1
Line	SILVERKG	230	to	RS-29	230	Circuit	2
Tran	CHOLLA	500	to	CHOLLA	345	Circuit	1
Tran	CHOLLA	500	to	CHOLLA	345	Circuit	2
Tran	FOURCORN	500	to	FOURCORN	345	Circuit	1
Tran	SAGUARO	500	to	SAG.EAST	115	Circuit	1
Tran	SAGUARO	500	to	SAG.WEST	115	Circuit	1
Tran	WESTWING	500	to	WESTWNGW	230	Circuit	2
Tran	WESTWING	500	to	WESTWNGW	230	Circuit	3
Tran	WESTWING	500	to	WESTWNGE	230	Circuit	1
Tran	WESTWING	500	to	WESTWING	345	Circuit	1
Tran	YAVAPAI	500	to	YAVAPAI	230	Circuit	1
Tran	YAVAPAI	500	to	YAVAPAI	230	Circuit	2
Tran	GILARIVR	500	to	PANDA	230	Circuit	1
Tran	MORGAN	500	to	RACEWAY	230	Circuit	1
Tran	MORGAN	500	to	RACEWAY	230	Circuit	2
Tran	PNPKAPS	500	to	PPAPS W	230	Circuit	1
Tran	PNPKAPS	500	to	PPAPS E	230	Circuit	1
Tran	PNPKAPS	500	to	PPAPS N	230	Circuit	1
Tran	CHOLLA	345	to	CHOLLA	230	Circuit	1
Tran	FOURCORN	345	to	FOURCORN	230	Circuit	1
Tran	FOURCORN	345	to	FOURCORN	230	Circuit	2
Tran	PNPKAPS	345	to	PPAPS C	230	Circuit	1
Tran	PNPKAPS	345	to	PPAPS E	230	Circuit	3
Tran	PNPKAPS	345	to	PPAPS N	230	Circuit	2
Tran	SAGUARO	230	to	SAG.EAST	115	Circuit	1
Tran	SAGUARO	230	to	SAG.WEST	115	Circuit	1
Tran	CORONADO	500	to	CORONADO	345	Circuit	1
Tran	CORONADO	500	to	CORONADO	345	Circuit	2
Tran	KYRENE	500	to	KYR-WEST	230	Circuit	6
Tran	KYRENE	500	to	KYR-EAST	230	Circuit	7
Tran	KYRENE	500	to	KYR-EAST	230	Circuit	8
Tran	SILVERKG	500	to	SILVERKG	230	Circuit	1
Tran	BROWNING	500	to	BROWNING	230	Circuit	1A
Tran	BROWNING	500	to	BROWNING	230	Circuit	1B
Tran	RUDD	500	to	RUDD	230	Circuit	1A
Tran	RUDD	500	to	RUDD	230	Circuit	1B
Tran	RUDD	500	to	RUDD	230	Circuit	3A
Tran	RUDD	500	to	RUDD	230	Circuit	3B
Tran	ABEL	500	to	ABEL	230	Circuit	1
Tran	ABEL	500	to	ABEL	230	Circuit	2
Tran	PINAL_C	500	to	PINAL_C	230	Circuit	1
Tran	PINAL_C	500	to	PINAL_C	230	Circuit	2
Tran	DUKE	500	to	TESTTRAK	230	Circuit	1
Tran	PINAL_W	500	to	PINALWES	345	Circuit	1
Tran	MESQUITE	500	to	MESQUITE	230	Circuit	1
Tran	MESQUIT2	500	to	MESQUITE	230	Circuit	1
Tran	GOLDFELD	230	to	GOLDFELD	115	Circuit	1
Tran	GOLDFELD	230	to	GOLDFELD	115	Circuit	2
Tran	SILVERKG	230	to	SILVERK1	115	Circuit	1
Tran	SILVERKG	230	to	SILVERK2	115	Circuit	1
Tran	COPPERVR	345	to	COPPERVR	230	Circuit	1
Tran	COPPERVR	345	to	COPPERVR	230	Circuit	2
Tran	APACHE	230	to	APACHE	115	Circuit	1
Tran	APACHE	230	to	APACHE	115	Circuit	2
Tran	BICKNELL	230	to	BICKNELL	115	Circuit	1
Tran	BICKNELL	230	to	BICKNELL	115	Circuit	2
Tran	BICKNELL	345	to	BICKNELL	230	Circuit	1
Tran	GREEN-SW	345	to	GREEN-SW	230	Circuit	1
Tran	PANTANO	230	to	PANTANO	115	Circuit	1
Tran	MEAD S	230	to	MEAD	287	Circuit	1
Tran	MEAD	345	to	MEAD N	230	Circuit	1

Tran	MEAD	500	to	MEAD N	230	Circuit	1
Tran	MEAD	500	to	MEAD N	230	Circuit	2
Tran	PARKER	161	to	PARKER	230	Circuit	1
Tran	PARKER	161	to	PARKER	230	Circuit	2
Tran	COOLIDGE	230	to	COOLIDGE	115	Circuit	1
Tran	COOLIDGE	230	to	COOLIDGE	115	Circuit	2
Tran	LIBERTY	345	to	LIBTYPHS	230	Circuit	1
Tran	LIBTYPHS	230	to	LIBERTY	230	Circuit	2
Tran	CASAGRND	230	to	CASAGRND	115	Circuit	1
Tran	PEACOCK	345	to	PEACOCK	230	Circuit	1
Tran	GLEN PS	230	to	GLENCANY	230	Circuit	1
Tran	GLENCANY	345	to	GLENCANY	230	Circuit	1
Tran	GLENCANY	345	to	GLENCANY	230	Circuit	2
Tran	PINPKBRB	345	to	PINPK	230	Circuit	1
Tran	PINPKBRB	345	to	PINPK	230	Circuit	2
Tran	PINPKBRB	345	to	PINPK	230	Circuit	3
Tran	SHIPROCK	230	to	SHIPROCK	115	Circuit	1
Tran	SHIPROCK	345	to	SHIPROCK	230	Circuit	1
Tran	SHIPROCK	345	to	SHIPROCK	230	Circuit	2
Tran	CEDARMT3	138	to	CEDARMT	500	Circuit	1
Tran	GALLEGOS	230	to	GALLEGOS	115	Circuit	1
Tran	SAN_JUAN	230	to	HOGBAK	115	Circuit	1
Tran	SHIP PS	230	to	SHIPROCK	230	Circuit	1
Tran	ED5-230	230	to	ED-5	115	Circuit	1
Tran	TORTOLIT	500	to	TORTOLIT	345	Circuit	1
Tran	MCKINLEY	345	to	YAHTAHEY	115	Circuit	1
Tran	SOUTH	345	to	SOUTH	138	Circuit	1
Tran	SOUTH	345	to	SOUTH	138	Circuit	2
Tran	VAIL	345	to	VAIL	138	Circuit	1
Tran	VAIL	345	to	VAIL	138	Circuit	3
Tran	VAIL2	345	to	VAIL	138	Circuit	1
Tran	VAIL2	345	to	VAIL	138	Circuit	2
Tran	WINCHSTR	345	to	WINCHSTR	230	Circuit	1
Tran	IRVMID3	138	to	IRVNGTN	138	Circuit	1
Tran	IRVMID4	138	to	IRVNGTN	138	Circuit	1
Tran	SPNCER	138	to	SPNCER	115	Circuit	1
Tran	TORTOLIT	138	to	SAG.EAST	115	Circuit	1
Tran	TORTOLIT	138	to	SAG.WEST	115	Circuit	1
Tran	TORTOLIT	138	to	TORTLIT2	500	Circuit	1
Tran	TORTOLIT	138	to	TORTOLIT	500	Circuit	1
Tran	TORTOLIT	138	to	TORTOLIT	500	Circuit	2
Tran	TORTOLIT	138	to	TORTOLIT	500	Circuit	3
Tran	TORTOLIT	138	to	TORTOLIT	500	Circuit	4
Tran	SNMANUEL	115	to	SNMANUEL	100	Circuit	1
Tran	N.GILA	500	to	N.GILA	230	Circuit	1
Tran	PRESCOTT	230	to	PRESCOTT	115	Circuit	1
Tran	PRESCOTT	230	to	PRESCOTT	115	Circuit	2
Tran	SNVLY	500	to	SNVLY	230	Circuit	1
Tran	SNVLY	500	to	SNVLY	230	Circuit	2
Tran	AVSOLAR	115	to	AVSOLAR	500	Circuit	1
Tran	RS-29	230	to	RAY	115	Circuit	2
Tran	RS-29	230	to	RAY	115	Circuit	5

Appendix E – Power Flow Results

The following table shows SRP elements loaded at 80% of their thermal limit or higher. The table shows the rating and flow of each transmission line in Amperes, and each transformer rating and flow is shown in MVA.

	Element	Rating	Actual	% Loading	Outage Element
2014	None				
2015	None				
2016	None				
2017	None				
2018	None				
2019	None				
2020	Rudd 500/230kV Transformer 1A	598	516.9	80.6%	Base
	Rudd 500/230kV Transformer 1B	598	518.4	80.9%	Base
	Rudd 500/230kV Transformer 3A	598	518.4	80.8%	Base
	Rudd 500/230kV Transformer 3B	598	527.9	81.7%	Base
	Mesquite 500/230kV Transformer 1	1500	1442.9	96.2%	Hassayampa to Mesquite 500/230kV 2
	Mesquite 500/230kV Transformer 1	1500	1442.9	96.2%	Mesquite 500/230kV Transformer 2
	Mesquite 500/230kV Transformer 2	1500	1442.9	96.2%	Hassayampa to Mesquite 500/230kV 1
	Mesquite 500/230kV Transformer 2	1500	1442.9	96.2%	Mesquite 500/230kV Transformer 1
	Browning 230/69kV Transformer 4	280	248.0	90.3%	Base
2021	None				
2022	None				
2023	Rudd 500/230kV Transformer 1A	598	490.4	82.6%	Base
	Rudd 500/230kV Transformer 1B	598	491.9	82.9%	Base
	Rudd 500/230kV Transformer 3A	598	481.9	81.0%	Base
	Rudd 500/230kV Transformer 3B	598	500.9	83.9%	Base
	Mesquite 500/230kV Transformer 1	1500	1451.1	96.7%	Mesquite 500/230kV Transformer 2
	Mesquite 500/230kV Transformer 2	1500	1451.1	96.7%	Mesquite 500/230kV Transformer 1
	Browning 230/69kV Transformer 4	280	269.7	98.7%	Base

Appendix F – Transient Stability List

500kV Outage List

ABEL-BROWNING
ABEL-PINAL CENTRAL
BROWNING 500/230 kV Transformers 1&2
BROWNING-ABEL
BROWNING-KYRENE
BROWNING-SILVER KING
CORONADO Generator 1
CORONADO Generator 2
CORONADO 500/345kV Transformers 1&2
CORONADO-SILVER KING
CORONADO-SUGARLOAF
DUKE 500/230kV Transformer
DUKE-PINAL CENTRAL
DUKE-PINAL WEST
HASSAYAMPA-ARLINGTON
HASSAYAMPA-GILA
HASSAYAMPA-HARQUAHA
HASSAYAMPA-HOODOO WASH
HASSAYAMPA-JOJOBA
HASSAYAMPA-MESQUITE Circuit 1
HASSAYAMPA-MESQUITE Circuit 2
HASSAYAMPA-PALO VERDE Circuit 1
HASSAYAMPA-PALO VERDE Circuit 2
HASSAYAMPA-PALO VERDE Circuit 3
HASSAYAMPA-PINAL WEST
HASSAYAMPA-RED HAWK Circuit 1
HASSAYAMPA-RED HAWK Circuit 2
JOJOBA-GILA Circuit 1
JOJOBA-GILA Circuit 2
JOJOBA-HASSAYAMPA
JOJOBA-KYRENE
KYRENE 500/230kV Transformer 6
KYRENE 500/230kV Transformer 7
KYRENE 500/230kV Transformer 8
KYRENE-BROWNING
KYRENE-JOJOBA
MESQUITE-HASSYAMPA Circuit 1
MESQUITE-HASSYAMPA Circuit 2
MESQUITE 500/230kV Transformer 1
MESQUITE 500/230kV Transformer 2
PINAL CENTRAL 500/230kV Transformer 1
PINAL CENTRAL 500/230kV Transformer 2
PINAL CENTRAL-ABEL
PINAL CENTRAL-DUKE
PINAL CENTRAL-TORTOLITA
PALO VERDE Generator 1
PALO VERDE Generator 2
PALO VERDE Generator 3
PALO VERDE-COLORADO RIVER
PALO VERDE-DELANY
PALO VERDE-HASSAYAMPA Circuit 1
PALO VERDE-HASSAYAMPA Circuit 2
PALO VERDE-HASSAYAMPA Circuit 3
PALO VERDE-RUDD
PALO VERDE-WEST WING Circuit 1
PALO VERDE-WEST WING Circuit 2
PINAL WEST 500/345kV Transformer
PINAL WEST-HASSAYAMPA
PINAL WEST-DUKE
RUDD 500/230kV Transformers 1A&1B
RUDD 500/230kV Transformers 3A&3B
RUDD-PALO VERDE
SILVER KING 500/230kV Transformer
SILVER KING-BROWNING
SILVER KING-CORONADO
SUGARLOAF 500/69kV Transformer
SUGARLOAF-CHOLLA
SUGARLOAF-CORONADO

230kV Outage List

ABEL 230/69kV Transformer
ABEL-DINOSAUR
ABEL-PFISTER
ABEL-RANDOLPH
AGUA FRIA Generator 4
AGUA FRIA Generators 5&6
AGUA FRIA 230/69kV Transformer 3
AGUA FRIA 230/69kV Transformer 4
AGUA FRIA APS 230/69kV Transformer 5
AGUA FRIA-ALEXANDER
AGUA FRIA-EL SOL
AGUA FRIA-GLENDALE
AGUA FRIA-WHITE TANKS
AGUA FRIA-WEST WING
ANDERSON 230/69kV Transformer 1
ANDERSON 230/69kV Transformer 2
ANDERSON 230/69kV Transformer 3
ANDERSON 230/69kV Transformer 4
ANDERSON-KYRENE NEW
ANDERSON-ORME Circuit 1
ANDERSON-ORME Circuit 2
ALEXANDER 230/69kV Transformer 1
ALEXANDER 230/69kV Transformer 2
ALEXANDER 230/69kV Transformer APS
ALEXANDER-AGUA FRIA
ALEXANDER-DEER VALLEY
BRANDOW 230/69kV Transformer 1
BRANDOW 230/69kV Transformer 2
BRANDOW 230/69kV Transformer 3
BRANDOW-KYRENE
BRANDOW-PAPAGO BUTTES
BRANDOW-PINACLE PEAK Circuit 2
BRANDOW-PINACLE PEAK Circuit 4
BRANDOW-WARD Circuit 1
BRANDOW-WARD Circuit 2
BROWNING 230/69kV Transformer 4
BROWNING 500/230kV Transformer 1&2
BROWNING-DINOSAUR
BROWNING-SANTAN
CORBELL 230/69kV Transformer 2
CORBELL 230/69kV Transformer 3
CORBELL 230/69kV Transformer 4
CORBELL-KYRENE
CORBELL-SANTAN
DESERT BASIN Generator 1
DESERT BASIN Generator 2
DESERT BASIN-CASA GRANDE
DESERT BASIN-PINAL CENTRAL
DESERT BASIN-SANTA ROSA
DINSOAUR 230/69kV Transformer
DINOSAUR-ABEL
DINOSAUR-BROWNING
GOLDFIELD 230/115kV Transformer 1
GOLDFIELD 230/115kV Transformer 2
GOLDFIELD-SILVER KING
GOLDFIELD-THUNDERSTONE Circuit 1
GOLDFIELD-THUNDERSTONE Circuit 2
KNOX 230/69kV Transformer
KNOX-KYRENE NEW
KNOX-SANTA ROSA
KYRENE Generator 5&6
KYRENE 230/69kV Transformer 2
KYRENE 230/69kV Transformer 3
KYRENE 230/69kV Transformer 4
KYRENE 500/230kV Transformer 7
KYRENE 500/230kV Transformer 8
KYRENE-BRANDOW
KYRENE-CORBELL
KYRENE-KYRENE NEW
KYRENE NEW 500/230kV Transformer 6
KYRENE NEW-ANDERSON
KYRENE NEW-KNOX
KYRENE NEW-KYRENE
KYRENE NEW-OCOTILLO
KYRENE NEW-PAPAGO BUTTES
KYRENE-SCHRADER
ORME 230/69kV Transformer 1
ORME 230/69kV Transformer 2
ORME 230/69kV Transformer 3
ORME 230/69kV Transformer 4
ORME-ANDERSON Circuit 1
ORME-ANDERSON Circuit 2
ORME-RUDD Circuit 1
ORME-RUDD Circuit 2
PAPAGO BUTTES 230/69kV Transformer 1
PAPAGO BUTTES 230/69kV Transformer 2

PAPAGO BUTTES 230/69kV Transformer 3
PAPAGO BUTTES 230/69kV Transformer 4
PAPAGO BUTTES-BRANDOW
PAPAGO BUTTES-KYRENE NEW
PAPAGO BUTTES-PINNACLE PEAK
PFISTER 230/69kV Transformer
PFISTER-ABEL
PFISTER-SANTAN
PINAL CENTRAL 500/230kV Transformer 1
PINAL CENTRAL 500/230kV Transformer 2
PINAL CENTRAL-DESERT BASIN
PINAL CENTRAL-RANDOLPH
PINAL CENTRAL-SUN ARIZONA
PINNACLE PEAK-BRANDOW Circuit 2
PINNACLE PEAK-BRANDOW Circuit 4
PINNACLE PEAK-DEER VALLEY
PINNACLE PEAK-PAPAGO BUTTES
PINNACLE PEAK-PINNACLE PEAK APS Circuit 1
PINNACLE PEAK-PINNACLE PEAK APS Circuit 2
PINNACLE PEAK-PINNACLE PEAK WAPA Circuit 1
PINNACLE PEAK-PINNACLE PEAK WAPA Circuit 2
RANDOLPH-ABEL
RANDOLPH-PINAL CENTRAL
ROGERS 230/69kV Transformer 2
ROGERS 230/69kV Transformer 4
ROGERS-ROGERS WAPA Circuit 1
ROGERS-ROGERS WAPA Circuit 2
ROGERES-THUNDERSTONE
RUDD 230/69kV Transformer 1
RUDD 500/230kV Transformers 1A&1B
RUDD 500/230kV Transformers 3A&3B
RUDD-LIBERTY
RUDD-ORME Circuit 1
RUDD-ORME Circuit 2
RUDD-PALO VERDE
RUDD-W PHOENIX APS
RUDD-WHITE TANKS
RUDD-WHITE TANKS APS
SCHRADER 230/69kV Transformer 1
SCHRADER 230/69kV Transformer 3
SCHRADER 230/69kV Transformer 4
SCHRADER-KYRENE
SCHRADER-SANTAN
SILVER KING 500/230kV Transformer
SILVER KING 230/115kV Transformer 1
SILVER KING 230/115kV Transformer 2
SILVER KING-GOLDFIELD
SANTAN Generator 5
SANTAN Generator 6
SANTAN Generator 1&3
SANTAN 230/69kV Transformer 3
SANTAN 230/69kV Transformer 4
SANTAN 230/69kV Transformer 5
SANTAN-BROWNING
SANTAN-CORBELL
SANTAN-PFISTER
SANTAN-SCHRADER
SANTAN-THUNDERSTONE
THUNDERSTONE 230/69kV Transformer 1
THUNDERSTONE 230/69kV Transformer 2
THUNDERSTONE 230/69kV Transformer 3
THUNDERSTONE 230/69kV Transformer 4
THUNDERSTONE-GOLDFIELD Circuit 1
THUNDERSTONE-GOLDFIELD Circuit 2
THUNDERSTONE-ROGERS
THUNDERSTONE-SANTAN
WARD 230/69kV Transformer 1
WARD 230/69kV Transformer 2
WARD-BRANDOW Circuit 1
WARD-BRANDOW Circuit 2
WHITE TANKS 230/69kV Transformer 1
WHITE TANKS 230/69kV Transformer 3
WHITE TANKS-AGUA FRIA
WHITE TANKS-RUDD

115kV Outage List

CRUSHER-COOLIDGE
CRUSHER-HAYDEN
FRAZIER-HORSE MESA
FRAZIER-MOONSHINE
FRAZIER-ROOSEVELT
GOLDFIELD-HORSE MESA
GOLDFIELD-MORMON FLAT
GOLDFIELD-SPURLOCK
HAYDEN-CRUSHER
HAYDEN-KNOLL
HORSE MESA Generator 4
HORSE MESA Generator 1,2,3
HORSE MESA-FRAZIER
HORSE MESA-GOLDFIELD
HORSE MESA-MORMON FLAT
KNOLL-HAYDEN
KNOLL-SUPERIOR
MORMON FLAT Generator 1&2
MORMON FLAT-GOLDFIELD
MORMON FLAT-HORSE MESA
MIAMI-MOONSHINE
MIAMI-PINAL
MIAMI-PINTO VALLEY
MOONSHINE-FRAZIER
MOONSHINE-MIAMI
MOONSHINE-PINAL
OAK FLAT-PINAL
OAK FLAT-SUPERIOR
PINAL-MIAMI
PINAL-MOONSHINE
PINAL-OAK FLAT
PINTO VALLEY-MIAMI
PINTO VALLEY-SUPERIOR
ROOSEVELT-FRAZIER
SPURLOCK-GOLDFIELD
SPURLOCK-SUPERIOR
SUPERIOR-KNOLL
SUPERIOR-OAK FLAT
SUPERIOR-PINTO VALLEY
SUPERIOR-SPURLOCK

Appendix G – Transient Stability Plots

Due to the large number of plots, the results for the Transient Stability will be made available upon request. Please send an email to transmissionplanning@srpnet.com for requests.